

Basic elements to consider in lexical access research with bilinguals and second-language learners

Elementos básicos a considerar en investigaciones de acceso al léxico con bilingües y aprendientes de segundas lenguas

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Abstract

This paper presents a critical overview of the characterization of bilinguals and lexical access for researchers in the field of language acquisition. The language acquisition and language use of bilinguals has been approached from different theoretical perspectives. These perspectives have described bilinguals' cognitive processing of the words they know as different from that of monolinguals. Additionally, they assume that the context and the language use of a second-language learner are similar to that of bilinguals, and do not always consider these factors when defining these two types of language users. This paper provides a perspective on some basic elements that should be considered in the study of lexical access processing with bilinguals and second-language learners.

Keywords: lexical access; bilinguals; proficiency; dominance; second-language learners

Resumen

Este artículo propone una visión crítica acerca de la caracterización de los bilingües y del acceso al léxico para investigadores en el área de la adquisición del lenguaje. Diversas perspectivas teóricas se han interesado por la adquisición del lenguaje y el uso del lenguaje en poblaciones bilingües. Estas perspectivas han descrito cómo el procesamiento cognitivo de las palabras que los bilingües conocen es diferente al procesamiento de los monolingües; asumen que el contexto y el uso de la lengua en un aprendiz de segundas lenguas y en los bilingües son similares, así que estos factores no siempre se consideran cuando se definen a estos dos tipos de usuarios de lengua. Este artículo brinda una perspectiva sobre los elementos básicos que deben considerarse en el estudio del procesamiento al acceso léxico de los bilingües y de los aprendientes de segundas lenguas.

Palabras clave: acceso al léxico; bilingües; proficiencia; dominio; aprendientes de segundas lenguas

1. Introduction. Key considerations in the characterization of bilinguals and second-language learners in psycholinguistic research*

Every study should clearly characterize the variables and concepts supported by a theoretical framework to provide valid interpretations of results. Researchers interested in recruiting bilinguals as participants should have a clear definition of what they mean by *bilingual*. There is an ongoing debate on this point among experts (for a review, refer to Kroll, Dussias, Bice & Perrotti, 2015), and efforts have been made to describe the main aspects of bilingualism. Currently, there is no consensus on a definition since there are different typologies of speakers and their contexts (Costa & Sebastián-Gallés, 2014). The typologies for bilinguals are also frequently used to describe second-language learners, and, therefore, the definition of these speakers may be unclear. This section briefly describes the current perspectives on the subject.

One general definition of bilingualism is that of Grosjean (2010), who indicates that a bilingual is a person who knows at least two languages. Marian, Hayakawa, Lam and Schroeder (2018) assume that bilinguals have a broader linguistic experience than monolinguals due to their acquisition of the first language (L1) plus a second language (L2). Linguistic experience is understood as a person's exposure to each language, which in bilinguals promotes the learning and use of languages in general.

Another typology sorts bilinguals into the *simultaneous* and *successive* categories (Costa & Sebastián-Gallés, 2014). Simultaneous bilinguals learn two languages at the same time, while successive bilinguals learn an L2 later in life through processes

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such as formal L2 learning, L2 immersion in a country, or migration. These classifications of bilinguals may consider the age when L2 acquisition started and the level of literacy in the L1. For instance, Marian *et al.* (2018) describes those who begin L2 acquisition before seven years of age as early bilinguals and the others as late bilinguals. Other researchers, however, consider late bilinguals as those who learn an L2 after four years old (Gervain, Sebastián-Gallés, Díaz, Laka, Mazuka, Yamane, Nespor & Mehler, 2013).

Age of acquisition is not the only relevant factor, however. The characterization as simultaneous, successive, early, and late bilingualism does not consider the personal and social domains in which bilinguals are immersed. Luk and Bialystok (2013) argue that bilinguals should not merely be classified according to categorical variables like age of L2 acquisition; they adopt a broader view, calling for the inclusion of language background and estimation of L2 performance with self-administered tests to provide a better understanding of their experience.

Similarly, the definitions of second-language learners are unclear: it is more common to find descriptions related to differences in the processing between learning a first and a second language than a definition *per se*. For instance, Rieder-Bünemann (2012) indicates that an L2 is different from the L1, and that learning an L2 can be different from that of a bilingual learning situation, as in the case of a child learning two languages simultaneously at home. This perspective might be limited because it considers only cognitive processing, disregarding factors such as the context and language use of the L2, or the L2 proficiency that second-language learners are developing. One proposal to clarify the description of second-language learners comes from The Douglas Fir Group (2016), which defines situations for learning and using languages other than the L1. One such situations is the formal learning of the L2 in contexts where no immersion experience is possible, that is, when the L1 is used for socialization and schooling and the L2 is learned only a few hours a week. In this view, second-language

learners have a different language use than bilinguals as defined by the authors just mentioned. The different definitions would affect the characterization of L2 proficiency, language processing, and learning since bilinguals, as previously defined, are immersed through schooling and socialization in the context of the L2. It is thus important to fully characterize the socialization and schooling context of bilinguals and second-language learners to avoid confusion regarding the context and the purpose for studying and using the L2.

Quantitative instruments have been developed to collect relevant information from children and adults who know more than one language as an approach to explore bilingualism more closely. The use of these instruments fulfills specific research objectives: each uses different domains to describe bilingualism. Examples are the Language Experience and Proficiency Questionnaire (LEAP-Q; Marian, Blumenfeld & Kaushanskaya, 2007) and the Language and Social Background Questionnaire (LSBQ; Anderson, Mak, Keyvani Chahi & Bialystok, 2018). LEAP-Q considers a person's language proficiency, dominance, and preference in different settings. It also collects data about age at language acquisition and past and current exposure to each language in different situations, including basic sociodemographic questions such as formal education and migration status. LSBQ shares some features with LEAP-Q, including questions about the context where each language is used, but also includes more detailed questions about language use in settings such as preschool, religious activities, Internet browsing, and language switching (the preference for one language over another when communicating with family and friends). According to Baker (2006), dimensions such as the context of language use or the culture promoting its use may be relevant for learning a second language. Qualitative instruments can also be used as a means to exploring multifactorial dimensions inherent to bilingualism. These instruments frequently employ open-ended questions and are generally tailored to the objectives of a particular study (for

example, refer to Delgado, Guerrero, Goggin & Ellis, 1999, and Rodríguez-Lázaro, 2015).

Quantitative and qualitative questionnaires should be included in any study of bilingual individuals to provide a closer look at the factors influencing the results. In addition, such studies should address the questions of language *proficiency* and *dominance*. These two notions, which are key to the concept of bilingualism, can help clarify the difference between language acquisition and performance as significant factors in the study of bilinguals (for example, refer to Bice & Kroll, 2021). Proficiency usually refers to a particular component of a language skill, including knowledge of vocabulary. It can be estimated through tests designed for this purpose (Montrul, 2016), such as the Test of English as a Foreign Language (TOEFL; Educational Testing Service, 2018) and the Quick Placement Test (QPT; Oxford University Press, n. d.). Proficiency exams like TOEFL provide information on L2 performance in reading, writing, grammar, and speaking. In addition, there are simplified tests to evaluate both proficiency and performance. LexTALE (Lemhöfer & Broersma, 2012) is a lexical decision test in which participants decide whether the word displayed on a screen exists in English. Lemhöfer and Broersma (2012) report that the results on this test are highly correlated with the results from proficiency tests like QPT; thus, LexTALE is a practical measure of proficiency in English as an L2, identifying whether a person has a beginner, intermediate, or advanced proficiency level (Lemhöfer & Broersma, 2012).

Dominance, which is closer to the concept of language acquisition in social domains, is frequently used to refer to an individual's main language used on a daily basis or to their prevailing exposure to one language. Dominance is generally measured with self-report questionnaires (Montrul, 2016). The Bilingual Language Profile (BLP; Birdsong, Gertken & Amengual, n. d.) is one example of such a questionnaire. It collects sociodemographic data and information related to the languages acquired by a person, including questions such as “At what age did you start to feel com-

fortable using the following languages?” Answers from the BLP can provide insight into the social and even personal factors that may impact language dominance in bilingual individuals.

Proficiency and dominance are different concepts: higher proficiency levels in one language do not determine language dominance (Vicente, Calandrucio, Miller, Browning, Oleson & Leibold, 2019). That is, proficiency can be operationalized as a linguistic characteristic, while dominance can be measured as a multidimensional construct in the acquisition of a second language, at least in adults (Montrul, 2016). For children, caregivers can provide the relevant information about proficiency and dominance related to the acquisition of the L1 and the L2 by children, their use of both languages at home, and the words they know in each language (Mayor & Mani, 2019; Byers-Heinlein, Tsui, Bergmann, Black, Brown, Carbajal, Durrant, Fennell, Fiévet, Frank, Gampe, Gervain, Gonzalez-Gomez, Hamlin, Havron, Hernik, Kerr, Killam, Klassen, Kosie, Kovács, Lew-Williams, Liu, Mani, Marino, Mastroberardino, Mateu, Noble, Orena, Polka, Potter, Schreiner, Singh, Soderstrom, Sundara, Waddell, Werker & Wermelinger, 2020).

This section has briefly outlined some of the main issues in characterizing bilinguals and second-language learners. The terms “bilingual” and “second-language learner” assume language experience and exposure to a language other than the L1; in addition, these terms imply the acquisition of a certain proficiency level in the L2 (except for people who have been exposed to languages other than the L1 without reaching proficiency or dominance). The objectives of a particular study will determine whether a researcher focuses on proficiency or dominance. If the main objective of a study with bilinguals is to determine which cultural factors promote L2 acquisition, then it should include tests of language dominance. Alternatively, if the objective is to explore performance in a skill such as word processing in the L1 and the L2 (i.e., lexical access), then the study should include proficiency tests (Bice & Kroll, 2021).

The following section provides a general perspective on how lexical access processing in bilinguals has been conceptualized.

2. Lexical access in bilinguals and second-language learners

Lexical access may be an indicator of language proficiency associated with word learning in bilinguals and second-language learners (Kroll & Bogulski, 2012). Lexical access implies that previously known words in the L2 are retrieved from memory and that this processing depends on the information perceived. Reading a text in the L2, for example, activates information related to the words we know. More specifically, in this paper, lexical access is defined as the process whereby all of the phonological, semantic, or other information embedded in a word becomes active or available following its recognition (Harley, 2005: 243). For instance, when we hear a specific sound, such as the /ʃ/ phoneme, different words with this phoneme might be triggered and activated, such as the word *shoe* (/ʃu/) (Kroll & Stewart, 1994; McClelland & Elman, 1986; Shook & Marian, 2013). Figure 1 shows an example of lexical access when the word *shoe* is heard or seen and the information that might become available. Words within circles, such as *show* (/ʃoʊ/) and *shock* (/ʃək/), share phonological features with *shoe* (/ʃu/). In contrast, words within rectangles, such as *shoelace*, *sneaker*, and *sock*, share semantic information with *shoe*. However, only one of these words will become available, or active, according to what triggers the word *shoe*. For instance, someone who learns the pronunciation and meaning of *shoelace* in the L2 activates the word *shoe* due to the similar pronunciation in the first syllable (*shoe-shoelace*), and its semantic relatedness also becomes active, since a shoelace is part of a shoe. The words *shock* or *show* will not become available in that context. In addition, factors such as the frequency of use of a word (i.e., the probability that a word appears in a conversation or in written texts), similarities in the form (e.g., visual shape), and meaning are conveyed to activate previously stored potential target words (McClelland & Elman, 1986; Shook & Marian, 2013).

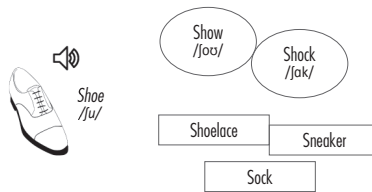


FIGURE 1. Activation of information related to the word *shoe* through an auditory or visual inputs.

Note: Images from Creative Commons. Shoe image from "File:Oxfordskor.svg"; Original: sv:User: Arbapp; Vectorization: User: Cerveaugenie, licensed under CC BY-SA 3.0. Speaker image from "File:Bw-unmuted.svg" by libertyernie, marked as CCO 1.0.

A number of researchers have attempted to explain, from a psycholinguistic perspective, how lexical access processing in monolinguals is achieved. They have had to explain increased lexical access in bilinguals as a means to account for the comprehension of words in more than one language. Diverse theoretical models have been proposed to describe this processing through the visual and auditory perception of words. This section provides an overview of some of these models (for an extensive review, refer to Li, 2013; Shirai, 2018; de Groot & Hagoort, 2018; and Thomas & van Heuven, 2005). One of the most accepted explanations of lexical access processing in monolinguals is the TRACE model (McClelland & Elman, 1986). This model seeks to characterize how linguistic information is connected and analyzed by different units in different layers. These units activate and inhibit distinct connections to recognize the information that is perceived (for further information on models such as TRACE, refer to Harley, 2005: 439). As stated by McClelland and Elman (1986), the name of this model refers to a trace in the information that is processed and analyzed simultaneously in each phase or layer. According to the TRACE model, lexical access in monolinguals is activated in two different ways: the units in each level identify words either visually or by their sound.

To describe differences in the lexical processing of monolinguals and bilinguals, Kroll and Stewart (1994) proposed the Revised Hierarchical Model (RHM; for an updated review of this

model, refer to Kroll, van Hell, Tokowicz & Green, 2010). This model assumes that words and concepts are stored by distinct labels in the L1 and L2, thus being directly connected and influenced by language proficiency in the L2. RHM suggests that L2 learners first translate words from the L1 to the L2 to access the meaning of the L2 words. As learners progress in the L2, access to this meaning is processed directly, without the mediation of the L1. In addition, RHM predicts that translations from the L1 to the L2 will be mediated conceptually due to the robust relationship between words and concepts in the L1 (Kroll & Bogulski, 2012).

Another model is the Bilingual Interactive Model (BIA) and its updated version BIA+ (Dijkstra & van Heuven, 2002), which suggest that L1 activation is available momentarily when L2 words are processed. Under this assumption, it is likely that bilinguals have lexical access that is similar to that of monolinguals, in which case there is only one language activated (Kroll & Bogulski, 2012).

A more recent model of lexical access and its processing in bilinguals is the Bilingual Language Interaction Network for Comprehension of Speech model (BLINCS) of Shook and Marian (2013). This computerized model simulates language processing in bilinguals when linguistic and non-linguistic information is perceived through visual or auditory inputs, or both. BLINCS is based on the interactive features of the TRACE, BIA+, and RHM models. Its general architecture includes different levels: semantic, phonological, phono-lexical, and ortho-lexical. On the phonological level there is a shared system between the two languages, and on the semantic level the concept representation of words is shared, as predicted by RHM. In computerized models, words are commonly stored prior to lexical processing simulations. These words are generally retrieved from lexical databases; in the BLINCS model, they are taken from SUBTLEXus (English words; Brysbaert & New, 2009) and SUBTLEXesp (Spanish words; Cuetos, Glez-Nosti, Barbón, & Brysbaert, 2011). These two databases include elements such as the lexical frequency of words in English and Spanish based on

subtitles for films and television programs. Since these subtitles resemble spoken language, the lexical frequencies they contain should resemble the use of a word among the speakers of a language. The BLINCS model was trained with SUBTLEXus and SUBTLEXesp as a way to learn and distinguish English and Spanish words, so the model learned the lexical frequency of the words in these two languages as well as their translation.

In the BLINCS model simulation, the word *face* was presented to the model as the target word, followed by the words *bed* and *windmill*, and the Spanish words *cama* and *cara* were then shown as lexical competitors. The model exhibited a greater activation for the Spanish word *cara* (“face”) and a lesser activation for *bed*, *windmill*, and *cama*. This evidence demonstrates that associations between words are strengthened, that the translation of words is an important process, and that the meaning of words will be equivalent in both languages (Shook & Marian, 2013). The BLINCS model thus offers a likely explanation for how words are processed by a bilingual, although further evidence is clearly needed to fully explain the phenomenon of lexical access in bilinguals and second-language learners.

The RHM, BIA, BIA+, and, more recently, BLINCS models are some cognitive models representative of the lexical access processing that occurs when bilinguals perceive words in two languages. The BLINCS model reliably contrasts and exemplifies lexical access in the L1 and L2, since it integrates the basic elements considered in models like RHM, BIA, and BIA+.

3. Considerations for future research about lexical access in bilinguals and second-language learners

As briefly described in Section 1, there are several definitions of bilingualism, which might be confusing to researchers. Hakuta (1990) states that no definition is broad enough to offer a clear characterization of a bilingual. All these definitions provide different perspectives aimed at clarifying the characterization in

particular ways and improve future research in the field. However, as the authors discussed herein have shown, lack of a careful definition of “bilingual” in a study is a serious limitation (for a detailed discussion of these limitations, refer to de Bruin, 2019; other studies examining bilingualism include Block, 2003; Franceschini, 2011; and Salzmann, 2000),¹ and the definition of a second-language learner might be indistinguishable from those used for bilinguals. This lack of an accurate characterization of these two types of language users, without sufficient attention to the contexts, language proficiency, and use of the L2, may lead to misunderstandings.

Distinct definitions have led to the different cognitive models presented here to provide approximations to answering the question of how bilinguals and second-language learners might process words, and additional evidence has been provided more recently from the neuroscience perspective (for a review, refer to Bialystok, 2017). Moreover, language proficiency and dominance are two major considerations for the performance of bilinguals and second-language learners in one or both languages, given that, according to Surrain and Luk (2019), few studies with bilinguals and second-language learners have reported an objective measure of proficiency. When exploring linguistic skills, proficiency is a key factor for an objective assessment of performance. Theoretical perspectives, such as the BLINCS model, are used to analyze lexical access processing in bilinguals. However, lexical access is only one perspective to address bilingual proficiency in an L2 and in second-language learners. Other theoretical frameworks may provide complementary perspectives, including those focusing on

¹ In this article, the concepts “multilingual” and “plurilingual” have not been addressed since they are proposals from Sociolinguistics. However, the use of these terms has provided a broader perspective about a person in contact with more than one language that should be considered in psycholinguistics research. Stavans and Hoffmann (2015) and García and Wei (2014) offer a detailed discussion of these concepts.

inhibitory control (Goral, Campanelli & Spiro, 2015) and syntactic proficiency (Huang, Pickering, Chen, Cai, Wang & Branigan, 2019). Inclusion of the evidence related to language processing in bilinguals and second-language learners provides additional perspectives on language proficiency and dominance.

Social variables should also be considered: tests of language dominance can provide additional information that could be relevant for comparing L1 and L2 use by bilinguals and second-language learners.

The questionnaires mentioned here, which were based on a bilingual scenario, could be adapted to the second-language learners' context where immersion in the L2 is a limited option. Information about practicing the L2 outside of formal learning could also provide an interesting insight on the characterization of bilinguals and second-language learners.

It is also important to consider related social and affective factors. Instruments evaluating language dominance can also provide supplementary information; more importantly, they could help us understand the language use by second-language learners that helps improve their proficiency in the L2. Research on bilinguals and second-language learners continues to produce improved instruments that provide quantitative and qualitative measures to address the complex experience of these speakers. There are different online tools available that can be adapted to focus on particular topics of interest in specific bilingual populations (for example, refer to the LEAP-Q model adapted for different languages).

Finally, the careful definition of second-language learners and bilinguals should include an objective measurement of language proficiency and dominance in lexical access research as a means to expand efforts in this area. Studies of bilinguals and second-language learners must be performed with analytical awareness and an objective assessment of each. This more detailed characterization could yield a better distinction between bilinguals and second-language learners, who experience the use of the L1 and the

L2 languages under different scenarios that may impact lexical access processing.

In conclusion, instead of looking for the ultimate definition of “bilingual” and “second-language learner,” we should seek to provide detailed information regarding factors in the L1 and the L2, such as language use, practice (dominance), and proficiency that contribute to a better understanding of language users and their experience.

4. References

- Anderson, John A. E.; Mak, Lorinda; Keyvani Chahi, Aram, & Bialystok, Ellen (2018). The language and social background questionnaire: Assessing degree of bilingualism in a diverse population. *Behavior Research Methods*, 50(1), 250–263. doi: 10.3758/s13428-017-0867-9
- Baker, Colin (2006). *Foundations of bilingual education and bilingualism*. Clevedon: Multilingual Matters Ltd.
- Bialystok, Ellen (2017). The bilingual adaptation: How minds accommodate experience. *Psychological Bulletin*, 143(3), 233–262. doi: 10.1037/bul0000099
- Bice, Kinsey, & Kroll, Judith F. (2021). Grammatical processing in two languages: How individual differences in language experience and cognitive abilities shape comprehension in heritage bilinguals. *Journal of Neurolinguistics*, 58, 100963. doi: 10.1016/j.jneuroling.2020.100963
- Birdsong, David; Gertken, L. M., & Amengual, Mark (n. d.). *Bilingual language profile: An easy-to-use instrument to assess bilingualism*. Austin: COERLL, University of Texas. <https://sites.la.utexas.edu/bilingual>
- Block, David (2003). *The social turn in second language acquisition*. Washington: Georgetown University Press.
- Byers-Heinlein, Krista; Tsui, Angelina Sin Mei; Bergmann, Christina; Black, Alexis K.; Brown, Anna; Carbajal, Maria Julia; Durrant, Samantha; Fennell, Christopher T.; Fiévet, Anne-Caroline; Frank, Michael C.; Gampe, Anja; Gervain, Judith; Gonzalez-Gomez, Nayeli; Hamlin, J. Kiley; Havron, Naomi; Hernik, Mikolaj; Kerr, Shila; Killam, Hilary; Klassen, Kelsey; Kosie, Jessica; Kovács, Ágnes Melinda; Lew-Williams, Casey; Liu, Liquan; Mani, Nivedita; Marina, Caterina; Mastrobardino, Meghan; Mateu, Victoria; Noble, Claire; Orena, Adriel John; Polka, Linda; Potter, Chris-

- tine E.; Schreiner, Melanie S.; Singh, Leher; Soderstrom, Melanie; Sundara, Megha; Waddell, Connor; Werker, Janet F., & Wermelinger, Stephanie (2020). A multi-lab study of bilingual infants: Exploring the preference for infant-directed speech. *Advances in Methods and Practices in Psychological Science*, 4(1). doi: 10.1177/2515245920974622
- Brybaert, Marc, & New, Boris (2009). Moving beyond Kučera and Francis: A critical evaluation of current word frequency norms and the introduction of a new and improved word frequency measure for American English. *Behavior Research Methods*, 41(4), 977–990. doi: 10.3758/BRM.41.4.977
- Costa, Albert, & Sebastián-Gallés, Núria (2014). How does the bilingual experience sculpt the brain? *Nature Reviews Neuroscience*, 15(5), 336–345. doi: 10.1038/nrn3709
- Cuetos, Fernando; Glez-Nosti, María; Barbón, Analía, & Brybaert, Marc (2011). SUBTLEX-ESP: Spanish word frequencies based on film subtitles. *Psicológica*, 32(2), 133–143. https://www.researchgate.net/publication/228988499_SUBTLEX-ESP_spanish_word_frequencies_based_on_film_subtitles
- de Bruin, Angela (2019). Not all bilinguals are the same: A call for more detailed assessments and descriptions of bilingual experiences. *Behavioral Sciences*, 9(3), 33. doi: 10.3390/bs9030033
- de Groot, Annette M. B., & Hagoort, Peter (Eds.) (2018). *Research methods in psycholinguistics and the neurobiology of language: A practical guide*. Oxford: Wiley.
- Delgado, Pedro; Guerrero, Gabriela; Goggin, Judith P., & Ellis, Barbara B. (1999). Self-assessment of linguistic skills by bilingual Hispanics. *Hispanic Journal of Behavioral Sciences*, 21(1), 31–46. doi: 10.1177/0739986399211003
- Dijkstra, Ton, & van Heuven, Walter J. B. (2002). The architecture of the bilingual word recognition system: From identification to decision. *Bilingualism: Language and Cognition*, 5(3), 175–197. doi: 10.1017/S1366728902003012
- Educational Testing Service (2018). *Test of English as a Foreign Language (TOEFL)*. <https://www.ets.org/>

- Franceschini, Rita (2011). Multilingualism and multicompetence: A conceptual view. *The Modern Language Journal*, 95(3), 344–355. doi: 10.1111/j.1540-4781.2011.01202.x
- García, Ofelia, & Wei, Li (2014). *Translanguaging: Language, bilingualism and education*. Basingstoke: Palgrave Macmillan. doi: 10.1057/9781137385765
- Gervain, Judith; Sebastián-Gallés, Núria; Díaz, Begoña; Laka, Itziar; Mazuka, Reiko; Yamane, Naoto; Nespor, Marina, & Mehler, Jacques (2013). Word frequency cues word order in adults: Cross-linguistic evidence. *Frontiers in Psychology*, 4, 689. doi: 10.3389/fpsyg.2013.00689
- Goral, Mira; Campanelli, Luca, & Spiro, Avron (2015). Language dominance and inhibition abilities in bilingual older adults. *Bilingualism*, 18(1), 79–89. doi: 10.1017/S1366728913000126
- Grosjean, François (2010). What bilingualism is NOT. *Multilingual Living*. https://www.francoisgrosjean.ch/bilingualism_is_not_en.html
- Hakuta, Kenji (1990). Bilingualism and bilingual education: A research perspective. *Occasional Papers in Bilingual Education*, 1. <https://eric.ed.gov/?id=ED321584>
- Harley, Trevor A. (2005). *The psychology of language: From data to theory*. Hove and New York: Taylor & Francis e-Library. <https://mohamedaljohani.files.wordpress.com/2014/10/psychology-of-language-from-data-to-theory.pdf>
- Huang, Jian; Pickering, Martin J.; Chen, Xuemei; Cai, Zhenguang; Wang, Suiping, & Branigan, Holly P. (2019). Does language similarity affect representational integration? *Cognition*, 185, 83–90. doi: 10.1016/j.cognition.2019.01.005
- Kroll, Judith F., & Stewart, Erika (1994). Category interference in translation and picture naming: Evidence for asymmetric connections between bilingual memory representations. *Journal of Memory and Language*, 33(2), 149–174. doi: 10.1006/jmla.1994.1008
- Kroll, Judith F.; van Hell, Janeth G.; Tokowicz, Natasha, & Green, David W. (2010). The revised hierarchical model: A critical review and assessment. *Bilingualism, Language and Cognition*, 13(3), 373–381. doi: 10.1017/S136672891000009X
- Kroll, Judith F., & Bogulski, Cari A. (2012). Organization of the second language lexicon. In Carol A. Chapelle (Ed.), *The encyclopedia of ap-*

- plied linguistics* (pp. 4322–4330). Oxford: Blackwell. <https://doi.org/10.1002/9781405198431.wbeal0886>
- Kroll, Judith F.; Dussias, Paola E.; Bice, Kinsey, & Perotti, Lauren (2015). Bilingualism, mind, and brain. *Annual Review of Linguistics*, 1, 377–394. doi: 10.1146/annurev-linguist-030514-124937
- Li, Ping (2013). Computational modeling of bilingualism: How can models tell us more about the bilingual mind? *Bilingualism: Language and Cognition*, 16(2), 241–245. doi: 10.1017/S1366728913000059
- Lemhöfer, Kristin, & Broersma Mirjam (2012). Introducing LexTALE: A quick and valid lexical test for advanced learners of English. *Behavioral Research*, 44, 325–343. doi: 10.3758/s13428-011-0146-0
- Luk, Gigi, & Bialystok, Ellen (2013). Bilingualism is not a categorical variable: Interaction between language proficiency and usage. *Journal of Cognitive Psychology*, 25(5), 605–621. doi: 10.1080/20445911.2013.795574
- Marian, Viorica; Blumenfeld, Henrike K., & Kaushanskaya, Margarita (2007). The language experience and proficiency questionnaire (LEAP-Q): Assessing language profiles in bilinguals and multilinguals. *Journal of Speech, Language, and Hearing Research*, 50, 940–967. doi: 10.1044/1092-4388(2007/067)
- Marian, Viorica; Hayakawa, Sayuri; Lam, Tuan Q., & Schroeder, Scott R. (2018). Language experience changes audiovisual perception. *Brain Sciences*, 8(5), 85. doi: 10.3390/brainsci8050085
- Mayor, Julien, & Mani, Nivedita (2019). A short version of the MacArthur–Bates communicative development inventories with high validity. *Behavior Research Methods*, 51, 2248–2255. doi: 10.3758/s13428-018-1146-0
- McClelland, James L., & Elman, Jeffrey L. (1986). The TRACE model of speech perception. *Cognitive Psychology*, 18(1), 1–86. doi: 10.1016/0010-0285(86)90015-0
- Montrul, Silvina (2016). Dominance and proficiency in early and late bilingualism. In Carmen Silva-Corvalán & Jeanine Treffers-Daller (Eds.), *Language dominance in bilinguals: Issues of measurement and operationalization* (pp. 15–35). Cambridge: Cambridge University Press. doi: 10.1017/CBO9781107375345
- Oxford University Press (n. d.). *Quick Placement Test*. <https://elt.oup.com/feature/global/oxford-online-placement/>

- Rieder-Bünemann, Angelika (2012). Second language learning. In Norbert M. Seel (Ed.), *Encyclopedia of the Sciences of Learning* (pp. 2980–2983). Boston: Springer. doi: 10.1007/978-1-4419-1428-6_826
- Rodríguez-Lázaro, Alma Luz (2015). Historia lingüística y autoevaluación por alumnos universitarios bilingües. *Perfiles Educativos*, 37(148). <https://doi.org/10.22201/iisue.24486167e.2015.148.49314>
- Salzmann, Zdenek (2000). Review of *Beyond bilingualism: Multilingualism and multilingual education*, by J. Cenoz & F. Genesee. *Language*, 76(4), 950. doi: 10.2307/417241
- Shirai, Yasuhiro (2018). *Connectionism and second language acquisition*. New York: Routledge. doi: 10.4324/9780203118085
- Shook, Anthony, & Marian, Viorica (2013). The bilingual language interaction network for comprehension of speech. *Bilingualism: Language and Cognition*, 16(2), 304–324. doi: 10.1017/S1366728912000466
- Stavans, Anat, & Hoffmann, Charlotte (2015). *Multilingualism (key topics in sociolinguistics)*. Cambridge: Cambridge University Press. doi: 10.1017/CBO9781316144534
- Surrain, Sarah, & Luk, Gigi (2019). Describing bilinguals: A systematic review of labels and descriptions used in the literature between 2005–2015. *Bilingualism: Language and Cognition*, 22(2), 401–415. doi: 10.1017/S1366728917000682
- The Douglas Fir Group (2016). A transdisciplinary framework for SLA in a multilingual world. *The Modern Language Journal*, 100(S1), 19–47. doi: 10.1111/modl.12301
- Thomas, Michael. S. C., & van Heuven, Walter. J. B. (2005). Computational models of bilingual comprehension. In Judith F. Kroll & Annette M. B. de Groot (Eds.), *Handbook of bilingualism: Psycholinguistic approaches* (pp. 202–225). New York: Oxford University Press.
- Vicente, Manuel; Calandruccio, Lauren; Miller, Margaret K.; Browning, Jenna M.; Oleson, Jacob, & Leibold, Lori J. (2019). Language proficiency and dominance considerations when working with Spanish-English bilingual adults. *American Journal of Audiology*, 28(3), 724–729. doi: 10.1044/2019_AJA-19-0028