Journal of Memory and Language 72 (2014) 1–15

Contents lists available at ScienceDirect

Journal of Memory and Language

journal homepage: www.elsevier.com/locate/jml

Differential processing of consonants and vowels in the auditory modality: A cross-linguistic study

Claire Delle Luche [a,*], Silvana Poltrock [b,c], Jeremy Goslin [a], Boris New [d,e], Caroline Floccia [a], Thierry Nazzi [b,c]

[a] School of Psychology, Plymouth University, United Kingdom
[b] Université Paris Descartes, Sorbonne Paris Cité, Paris, France
[c] CNRS, Laboratoire Psychologie de la Perception, UMR 8158, Paris, France
[d] Institut Universitaire de France, Paris, France
[e] Laboratory of Psychology and Neurocognition, UMR 5105, CNRS, University of Savoie, BP 1104, F-7301 Chambéry cedex, France

ARTICLE INFO

Article history:
Received 11 December 2012
revision received 25 November 2013
Available online 25 December 2013

Keywords:
Auditory priming
Consonants and vowels
Phonological processing
Auditory word recognition
Cross-linguistic

ABSTRACT

Following the proposal by Nespor, Peña, and Mehler (2003) that consonants are more important in constraining lexical access than vowels, New, Araújo, and Nazzi (2008) demonstrated in a visual priming experiment that primes sharing consonants (*jalu-JOLI*) facilitate lexical access while primes sharing vowels do not (*vobi-JOLI*). The present study explores if this asymmetry can be extended to the auditory modality and whether language input plays a critical role as developmental studies suggest. Our experiments tested French and English as target languages and showed that consonantal information facilitated lexical decision to a greater extent than vocalic information, suggesting that the consonant advantage is independent of the language's distributional properties. However, vowels are also facilitatory, in specific cases, with iambic English CVCV or French CVCV words. This effect is related to the preservation of the rhyme between the prime and the target (here, the final vowel), suggesting that the rhyme, in addition to consonant information and consonant skeleton information is an important unit in auditory phonological priming and spoken word recognition.

© 2013 Elsevier Inc. All rights reserved.

Introduction

Consonants and vowels are described as two separate phonological categories (Ladefoged, 2001; Maddieson, 1984; but see Carré, 2009 and Stilp & Kluender, 2010, for a unification proposal), with many differing properties: consonants are shorter and perceived more categorically; there is more variability in the production of vowels than of consonants; vowels are often harmonized within words while consonants are not (Repp, 1984). There is also neuropsychological (Caramazza, Chialant, Capasso, & Miceli, 2000; Ferreres, López, & China, 2003) and neurophysiological evidence (Carreiras & Price, 2008; Carreiras, Vergara, & Perea, 2009; Vergara-Martínez, Perea, Marín, & Carreiras, 2011) for different brain loci involved in their processing. These fundamental differences are also reflected in the distribution of consonants and vowels in the world's languages: most languages have more consonants than vowels (Maddieson, 1984), making consonantal information more informative for word identification. Altogether, these observations led to the proposal that consonants are more important than vowels in lexical processing while vowels are more important than consonants in relation to prosodic–syntactic information (Nespor, Peña, & Mehler, 2003). This proposal assumes that these properties of consonants and vowels are universal – supported by a language module (Bonatti, Peña, Nespor, & Mehler, 2005,

* Corresponding author. Address: School of Psychology, Portland Square B214, Plymouth University, Plymouth PL4 8AA, United Kingdom. Fax: +44 (0)1752 584808.
E-mail address: claire.delleluche@plymouth.ac.uk (C. Delle Luche).

0749-596X/$ - see front matter © 2013 Elsevier Inc. All rights reserved.
http://dx.doi.org/10.1016/j.jml.2013.12.001

2007) – and therefore valid across languages regardless of linguistic specificities (for a discussion, see Bonatti et al., 2007).

The evaluation of the contribution of consonantal and vocalic information in word learning and lexical processing in adults confirms the existence of a consonantal bias across a number of languages. Regarding word learning, Creel, Aslin, and Tanenhaus (2006) demonstrated with an artificial lexicon-learning paradigm that English-speaking adults confuse newly learned words more often when they share their consonants (e.g., *suba* – *sabo*) than when they share their vowels (e.g., *nasi* – *tagi*), suggesting that consonants contribute to lexical identification to a larger extent than vowels. This consonantal advantage was not modulated by the relative ratio between consonants and vowels in the learned words, although some modulation was found with respect to segment position (e.g., a weakened consonant effect in the coda position). In another recent study on adult word learning, Havy, Serres, and Nazzi (in press) found that French-speaking adults identify an object on a screen faster when its newly learned label differs from a distracter's label by one consonant (e.g., target label /pyv/ – distracter label /tyv/) compared to when it differs by one vowel (e.g., /pos/ – /poes/). In contrast to the findings in Creel, Aslin, et al. (2006), no positional effect was found (with respect to the onset/coda difference). In sum, the interaction between the consonant bias and positional effects in these types of tasks remains rather unclear.

Moreover, when segmenting continuous speech in an artificial language, Bonatti et al. (2005) showed that French speakers are able to extract families of words when transitional probabilities highlight common consonants (e.g., /puʁagi/ /puʁegy/), but not common vowels (e.g., /pɔkima/ /pɔʁila/). The use of vocalic regularities seems privileged for the extraction of structural, grammar-like rules (see Toro, Nespor, Mehler, & Bonatti, 2008), but not lexical cues, except in conditions allowing consecutive repetitions of the same word family (Newport & Aslin, 2004).

Second, regarding lexical processing, classic adult word processing tasks also point to an advantage for consonantal information. In word reconstruction tasks in which an auditory pseudoword has to be transformed into a real word by changing one phoneme, listeners prefer to preserve the consonantal structure over the vocalic one, so that *kebra* would be changed into *cobra* rather than *zebra*. Comparable results have been observed in English (Sharp, Scott, Cutler, & Wise, 2005; van Ooijen, 1996), Dutch and Spanish (Cutler, Sebastián-Gallés, Soler-Vilageliu, & van Ooiken, 2000). Visual priming experiments, on the whole, also converge toward a consonantal priming effect, as attested by the results found using the relative-position (*csn* preceding *casino* is facilitatory, but not *aio*, Duñabeitia & Carreiras, 2011), the delayed-letter (e.g., *bu-b* or *b-lb* as primes preceding *bulb*, Vergara-Martínez et al., 2011) and the replaced-letter (e.g., *duvo* or *rifa* preceding *diva*, New & Nazzi, in press; New, Araújo, & Nazzi, 2008) paradigms. On the contrary, studies using the transposed-letter paradigm (e.g., *academy* preceded by *adacemy* or *acedamy*, Carreiras et al., 2009; Lupker, Perea, & Davis, 2008; Perea & Carreiras, 2006; Perea & Lupker, 2004) revealed a vowel advantage. However, it has been suggested that effects found in the transposed-letter paradigm are mostly due to orthographic processing (Acha & Perea, 2010) while studies using paradigms tapping the phonological level only show a consonant advantage (see New & Nazzi, in press, for a more detailed argument). In favor of this argument, replaced-letter experiments (New & Nazzi, in press; New et al., 2008), where the whole consonant or vowel tier is replaced, established an advantage of consonant-related primes (e.g., *duvo*) for prime durations of 50 and 66 ms, durations at which phonological effects are typically observed (Grainger & Ferrand, 1994, 1996). No consonant advantage was observed with shorter primes (33 ms) that usually only induce orthographic priming. This series of studies (see also Berent & Perfetti, 1995; Columbo, Zorzi, Cubelli, & Brivio, 2003; Lee, Rayner, & Pollatsek, 2001) suggests that the locus of this consonant bias is at the phonological rather than the orthographic level. The present study will explore another way to disentangle phonological from orthographic effects: adults were tested here in the auditory modality, which should favor the use of phonological over orthographical information.

Further insight into the mapping between phonological forms and lexical representations can be gained through infant studies. Word learning tasks with pairs of words differing by one phoneme reveal that French-learning toddlers are sensitive to consonant but not to vowel contrasts until the age of 30 months (Havy & Nazzi, 2009; Nazzi, 2005; Nazzi & Bertoncini, 2009; Nazzi, Floccia, Moquet, & Butler, 2009; Nazzi & New, 2007). Moreover, even older French-learning children and French adults show a consonant bias in word learning tasks (Havy, Bertoncini, & Nazzi, 2011; Havy et al., in press). A comparable asymmetry is observed with a familiar word recognition task in French-learning 14–23-month-olds: a consonant change prevents word recognition, but not a vowel change (Zesiger & Jöhr, 2011). However, results from English-learning children do not show such a pervasive consonantal bias. Indeed, while Nazzi et al. (2009) showed that 30-month-old English children give more weight to consonantal information when learning new words, Creel (2012) reported an equal sensitivity to consonant and vowel mispronunciations in familiar words in 3.5-year-old children. In addition, younger children have been found to access vocalic information as well as consonant information in lexical processing (Mani & Plunkett, 2007, 2008) and word learning (Floccia, Nazzi, Delle Luche, Poltrock, & Goslin, in press). This undermines the assumption of a universal consonantal bias in place at the onset of lexical acquisition. Recent work using an interactive word learning task in Danish, a language with many more vowels than consonants (19 consonants vs. 16 vowels, doubled with a duration contrast and 2 schwas, Bleses, Basbøll, Lum, & Vach, 2010), revealed that Danish-learning 20-month-olds rely more on vocalic than consonantal information (Højen & Nazzi, in preparation; Nazzi et al., 2011). This suggests that the phoneme inventory or the acoustic characteristics of a given language (e.g., consonantal lenition that makes consonants less prominent in Danish) is important in development, and might also be in adulthood.

Although these previous studies have provided considerable evidence on the relative importance of consonantal

Download English Version:

https://daneshyari.com/en/article/931875

Download Persian Version:

https://daneshyari.com/article/931875

Daneshyari.com