



Bilingual vocabulary size and lexical reading in Italian



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ARTICLE INFO

Article history:

Received 9 February 2013

Received in revised form 17 September 2013

Accepted 23 September 2013

Available online 17 October 2013

PsycINFO classification:

2720 Linguistics & Language & Speech

Keywords:

Bilingualism
Reading aloud
Vocabulary size
Lexical effects
Word stress assignment

ABSTRACT

In the present study we investigated how the vocabulary size of English–Italian bilinguals affects reading aloud in Italian (L2) modulating the reader's sensitivity to lexical aspects of the language. We divided adult bilinguals in two groups according to their vocabulary size (Larger – LV, and smaller – SV), and compared their naming performance to that of native Italian (NI) readers. In Experiment 1 we investigated the lexicality and word frequency effects in reading aloud. Similarly to NI, both groups of bilinguals showed these effects. In Experiment 2 we investigated stress assignment – which is not predictable by rule – to Italian words. The SV group made more stress errors in reading words with a non-dominant stress pattern compared to the LV group. The results suggest that the size of the reader's L2 lexicon affects the probability of correct reading aloud. Overall, the results indicate that proficient adult bilinguals show a similar sensibility to the statistical and distributional properties of the language as compared to Italian monolinguals.

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1. Introduction

Different models have sought to investigate the mechanisms at the basis of word recognition and these can be distinguished, in general, into two types: Single and dual route mechanisms models. The single-route perspective claims the existence of a single mechanism – where all sources of information are available in parallel – which learns the statistical consistencies between graphemes and phonemes (Plaut, McClelland, Seidenberg, & Patterson, 1996; Seidenberg & McClelland, 1989) and allows reading of both words and pseudowords. On the other hand, the dual route model of reading aloud (Coltheart, 1978; Coltheart, Rastle, Perry, Langdon, & Ziegler, 2001) argues that two distinct processes are needed: A sublexical process that enables a linear mapping between orthographic and phonological patterns (used in reading pseudowords and non-familiar words) and a lexical process that retrieves word-specific information from the lexicon, where the lexical representations of the known words are stored. Similarly to what found in more opaque orthographies, frequency effects (high-frequency words read faster than low-frequency words) and lexicality effects (words read faster than pseudowords) have been reported in reading Italian aloud (Burani, Arduino, & Barca, 2007; Pagliuca, Arduino, Barca, & Burani, 2008), and these effects have been interpreted, within the DRC model, as evidence

of lexical reading even in a language with transparent orthography as Italian (Tabossi & Laghi, 1992).

Italian is a transparent orthography, as the great majority of words can be read correctly without the need of lexical access, but by relying on the grapheme–phoneme correspondence mapping which, in the case of Italian, is quite consistent (Coltheart et al., 2001). Crucially, some Italian words are not completely transparent, needing lexical look-up for correct pronunciation. In particular stress assignment to words of three or more syllables cannot be predicted on the basis of phonological rules.¹ Most Italian words (80%) are stressed on the penultimate syllable, and this can be considered the dominant stress pattern. A smaller percentage of three- and four-syllable words (around 18%) are stressed on the antepenultimate syllable, and this is the non-dominant stress pattern.² Even if not predictable by rule, stress location has a statistically known distribution and it is one of the most intriguing aspects of the Italian language, making it for this only aspect similar to the languages with an opaque orthography. An interaction between stress type and word frequency has been described in the literature on reading: Words with dominant stress may be read aloud faster and

¹ There is only one rule in Italian to assign stress to polysyllabic words. This refers to the weight of the penultimate syllable: If it is heavy – that is, if it ends with a consonant (e.g., bisonte, 'bison') – then it has to bear stress (Krämer, 2009). However, there are exceptions to the rule (e.g., mandorla ('almond') or Lepanto ('Lepanto'), which are stressed on the antepenultimate syllable.

² A small percentage of words (less than 2%) have final stress (e.g., città, 'city'). Only in this case stress is orthographically marked.

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more accurately than words with non-dominant stress, but only when these are of low-frequency (Colombo, 1992; Rastle & Coltheart, 2000). However, several authors (e.g., Arculi & Cupples, 2006; Burani & Arduino, 2004; Colombo, 1992) have suggested that stress assignment especially for low-frequency words is also affected by the number of words that share the same stress pattern and final orthographic/phonological sequence (stress neighborhood; see Burani & Arduino, 2004): Low-frequency words are easier to read when they have many stress friends than when they have many stress enemies. Therefore, Italian readers are influenced by the distributional properties of stress and correct stress assignment in reading relies on knowledge of several words in the reader's language.

The description of lexical effects in Italian highlights the importance of the reader's lexical knowledge or vocabulary size in reading aloud. In particular, a larger vocabulary size may lead to greater sensitivity to the lexical status of the target, to its frequency and to its stress pattern. If the vocabulary size of the reader modulates reading aloud in Italian, what happens when Italian is learned as a second language (L2)? It might be expected that the size of the vocabulary in L2 would affect naming times and accuracy, favoring bilinguals with a larger vocabulary size in reading words, and making correct stress assignment more likely.

The breadth of the readers' vocabulary has been shown to be predictive of the reading skills of bilingual children (Jean & Geva, 2009). The word frequency effect has been reported in bilinguals tested in their L2 using the lexical decision experimental procedure (Duyck, Vanderleest, Desmet, & Hartsuiker, 2008; Gollan et al., 2011; Van Assche, Duyck, & Hartsuiker, 2012) or the progressive demasking task (Lemhöfer et al., 2008). Furthermore, lexicality effects in L2 have been reported in bilinguals using a forced choice letter identification task where participants recognized words faster than pseudowords, and pseudowords faster than illegal nonwords (Grossi, Murphy, & Boggan, 2009). The presence of such lexical effects in late bilinguals (L2 learned during or after puberty) indicates that, after prolonged exposure to a second language, bilinguals can be as efficient as native speakers in orthographic processing.

Altogether these results highlight the importance of the lexicon breadth and lead to the hypothesis that differences in vocabulary size may give rise to different sensitivities to the lexical properties of a language. However, to the best of our knowledge, the lexical effects previously described in adult bilinguals have not been systematically explored in reading aloud, a task which, instead, could give valuable information about lexical processing in relation to different vocabulary breadths of bilinguals who have learned an L2 in adulthood.

We investigated the role of vocabulary size in reading Italian aloud in two groups of bilinguals, expecting that the breadth of their lexicon should modulate lexical effects. To this aim in the present study a group of bilinguals (L1 = English, L2 = Italian), proficient in Italian, was selected and tested with a reading aloud task in Italian. We divided bilinguals in two groups according to their vocabulary size, as assessed by means of a lexical decision task and a semantic fluency task. A matched control group of Native Italian monolinguals (NI) was also tested in the same tasks.

In the first experiment we aimed at investigating the presence of lexicality and frequency effects in reading aloud words and pseudowords. We expected the presence of such effects in both groups of bilinguals, given that they were all proficient in Italian. In addition, we expected a smaller lexicality effect in the bilingual readers with a smaller vocabulary size, especially when low-frequency words are contrasted to pseudowords: If low-frequency words have a low probability to be known by readers with a smaller vocabulary, these words are also expected to be processed more similarly to pseudowords, so longer reaction times and a larger proportion of errors for low-frequency words in individuals with a smaller vocabulary than in individuals with a larger vocabulary are probable.

In the second experiment we investigated stress assignment to Italian words, using three- and four-syllable words differing for frequency and stress pattern (dominant vs. non-dominant). For these words stress

position is not predictable by rule and lexical knowledge is required to correctly attribute stress to the word. We expected slower RTs than in Experiment 1 since longer words were used; we also expected the presence of stress errors in bilinguals especially in reading low-frequency non-dominant stressed words. Finally, we predicted that the number of stress errors would interact with vocabulary size in bilinguals. Bilinguals with a smaller vocabulary size are expected to know less words compared to the larger vocabulary group. Consequently, in the former group of readers some reliance on the statistical distribution of stress in the language is expected, that would lead to more regularization errors in reading non-dominant stressed words. Conversely, a larger vocabulary size may allow correct stress assignment even to low-frequency words.

2. Method

2.1. General procedure

Participants were tested in Italian in a single session lasting about 1 h, in a quiet room. A paper and pencil language background questionnaire (LBQ-NE - adapted from the "Language History Questionnaire" by Li, Sepanski, & Zhao, 2006) was administered first, followed by two Vocabulary tests (Semantic fluency and visual Lexical decision). Then, in the same session, two experimental naming tasks (Experiment 1: Lexicality and frequency effects in reading aloud Italian; Experiment 2: Stress assignment in reading Italian words aloud) were administered.

2.2. Native English participants selection criteria

Forty-six native English (NE) speakers participated in this study. Participants were recruited using certain criteria to assure that they had learned Italian in adulthood but also had a good level of proficiency in Italian. To this end we selected only participants who had arrived in Italy not before being 18 years old and who had lived in Italy for a minimum of five years at the time of testing. Further confirmation of participant's competence on the Italian language was obtained using a self-report questionnaire on the language background (LBQ-NE; adapted from the "Language History Questionnaire" by Li et al., 2006). On a Likert scale from one to seven (where one corresponded to "poor" and seven corresponded to "good") all of the participants rated their own competence levels in speaking, listening, writing and reading in Italian.

2.3. Screening tests

In order to evaluate the Italian vocabulary size of NE participants, we administered two screening tests: A semantic fluency task as an estimation of productive vocabulary; a lexical decision task, as an estimation of receptive vocabulary.

2.3.1. Semantic fluency

The Semantic fluency task is used to assess the efficiency of word retrieval based on a cue consisting of a semantic category and it is considered to reflect the vocabulary size in bilinguals (Bialystok, Craik, & Luk, 2008; Gollan, Montoya, & Werner, 2002). Participants were asked to verbally produce (within 60s) all the Italian words they were able to retrieve for a given semantic field. The participant's performance was recorded and the scoring was made offline. The categories were selected considering normative data on Italian adults (Boccardi & Cappa, 1997) such as not to include categories whose members were likely to have "cognates" in the English language (see Costa, Santesteban, & Cano, 2005), or categories in which gender differences had been observed (Capitani, Laiacona, & Barbarotto, 1999). A practice category (animals) was given to ensure that the task was well understood. The experimental categories were: i) body parts; ii) supermarket items; iii) means of transport; iv) clothes; and v) jobs. A score for each category, namely

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