Journal of Experimental Child Psychology 105 (2010) 359–375

Contents lists available at ScienceDirect

Journal of Experimental Child Psychology

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

Reading development in agglutinative languages: Evidence from beginning, intermediate, and adult Basque readers

Joana Acha [a,*], Itziar Laka [b], Manuel Perea [a]

[a] Departamento de Metodología, Facultad de Psicología, Universitat de Valencia, 46010 Valencia, Spain
[b] Departamento de Lingüística y Estudios Vascos, Universidad del País Vasco, 01006 Vitoria-Gasteiz, Spain

ARTICLE INFO

Article history:
Received 25 June 2009
Revised 27 October 2009
Available online 8 December 2009

Keywords:
Word recognition
Reading development
Orthographic representation
Inflectional morphology
Agglutination
Lexical access

ABSTRACT

Do typological properties of language, such as agglutination (i.e., the morphological process of adding affixes to the lexeme of a word), have an impact on the development of visual word recognition? To answer this question, we carried out an experiment in which beginning, intermediate, and adult Basque readers ($n = 32$ each, average age = 7, 11, and 22 years, respectively) needed to read correctly versus incorrectly inflected words embedded in sentences. Half of the targets contained high-frequency stems, and the other half contained low-frequency stems. To each stem, four inflections of different lengths were attached (*-a*, *-ari*, *-aren*, and *-arentzat*, i.e., inflectional sequences). To test whether the process of word recognition was modulated by the knowledge of word structure in the language, half of the participants' native language was Basque and the other half's native language was Spanish. Children showed robust effects of frequency and length of inflection that diminished with age. In addition, the effect of length of inflection was modulated by the frequency of the stem and by the native language. Taken together, these results suggest that word recognition develops from a decoding strategy to a direct lexical access strategy and that this process is modulated by children's knowledge of the inflectional structure of words from the beginning of their reading experience.

* Corresponding author. Fax: +34 963 864697.
E-mail address: amorjo@valencia.edu (J. Acha).

0022-0965/$ - see front matter © 2009 Elsevier Inc. All rights reserved.
doi:10.1016/j.jecp.2009.10.008

Introduction

Visual word recognition is one of the key processes involved in successful reading. Although this skill demands little effort in adult readers, it is not a natural ability and requires learning several skills (e.g., phonological awareness, letter identification) that finally lead to accurate and fluent reading. Therefore, fluent reading usually comes after a long period of extensive practice (La Berge & Samuels, 1974; Tan & Nicholson, 1997). Previous studies have shown that this period is considerably short in transparent orthographies such as German, Italian, and Greek, where learning the regularities of the orthography becomes relatively easy due to the unambiguous grapheme–phoneme correspondence (see Landerl, Wimmer, & Frith, 1997). However, to our knowledge, there are no published studies that have focused on how word recognition processes develop in orthographically transparent languages that have agglutinative morphology, such as Turkish and Basque (languages in which syntactic phrases tend to constitute words formed by stacking functional morphemes to the end of a stem). Due to the agglutinative nature of these languages (see Durgunôglu, 2006), readers need to deal with rather long words (e.g., Basque *mutil-a-ren-gana-ko-a-ri* [boy-det-gen-toward-rel-det-dat], "to the one toward the boy"). In the current experiment, we examined the development of Basque inflected word recognition in beginning, intermediate, and adult readers who were receiving school instruction in Basque language. Due to the coexistence of Basque and Spanish languages (transparent agglutinative and transparent nonagglutinative, respectively) in the Basque Country in Spain, we explored whether the way lexical access is achieved is modulated by the typological properties of the language's morphology by comparing the reading behaviors of children who differed in their proficiency on Basque morphology.

According to most theories of reading, learning to decode words is a basic step in word recognition (Perfetti & Lesgold, 1977). When children start learning to read, they map graphemes onto phonemes to read new words (phonetic–alphabetic reading stage [Ehri, 1995]). During this stage, children acquire knowledge about specific letter identities and their corresponding sounds (Frith, 1985). Thus, decoding words becomes the first reading strategy used by children in alphabetic languages, requiring them to phonologically recode from print to sound unfamiliar words that conform to regular grapheme–phoneme correspondences. However, to be fluent readers, children still need to become aware of the regularities of their own language (see Share, 1995) and recurring letter patterns need to be consolidated with reading experience. This is possible through a reciprocal interaction between orthography and phonology (Landerl, Frith, & Wimmer, 1996): Children learn to link orthographic information to the phonemes they know, but they also learn to use their phonological knowledge to extract and retrieve orthographic regularities in their writing system. This way, children develop from the recognition of small units to larger units until complete words are represented in the lexicon (Duncan, Seymour, & Hill, 2000). At this stage (consolidated alphabetic stage [Ehri, 1995; but see Beech, 2005; Frith, 1985]), children are able to read words automatically—fast and accurately—without great effort. The main sources of concern about this process involve two questions. First, at what age is automatic word recognition attained in languages with transparent orthographies? Second, to what extent does the internal structure of words influence the way automatic reading is achieved in these languages?

Recent work in the area of reading development indicates that consistent and transparent orthographies pose few constraints to reach the alphabetic stage (see Rack, Snowling, & Olson, 1992; Ziegler & Goswami, 2005). In transparent orthographies, rapid and accurate reading is achieved from 5 to 7 years of age depending on the level of consistency and teaching method (Ziegler & Goswami, 2005). The logic behind this is that in languages with transparent orthographies (e.g., German, Turkish, Greek), children may learn grapheme–phoneme rules without great difficulty (Wimmer, 1993). Thus, it seems clear that the age when automatic reading is achieved depends on the consistency with which the alphabet represents phonemes by means of graphemes (Aro & Wimmer, 2003; Wimmer & Goswami, 1994). For example, German children are able to read words and nonwords without difficulty in first grade (approximately 6 years of age), so that they reach the ceiling of competent reading relatively quickly (Wimmer, Mayringer, & Landerl, 2000). This also occurs at a very early age (approximately 6 years) in Spanish readers, although precise control of lexical information is achieved later