Suffix perceptual salience in morphological processing: evidence from Italian

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Abstract

The goal of the present research is to determine the role of suffixes and morphological schemas in the access and processing of Italian complex words and to investigate whether (and possibly to what extent) suffix salience affects such processes. Two experiments using the masked-priming methodology will contribute to verify if native speakers of Italian organize lexical items according to morphological series as they do according to morphological families.

1 Introduction

In usage-based approaches to language representation and process (mainly Bybee's Network Model and Booij's Constructional Morphology), morphology is generally conceived as organizing the lexicon according to two main dimensions: i) morphological families, i.e. words connected because sharing the same root: *kind/ kindness/ kindly/ unkind/ kind-hearted*, etc. and ii) morphological series, i.e. words connected because sharing the same affix *kindness/ happiness/ sadness/ abruptness*, etc. Psycholinguistic research has mostly confirmed this view, demonstrating with experimental data that words in the mental lexicon are stored according to formal and semantic similarity, thus following morphological principles.

More specifically, the relationship between morphologically complex words and their roots (or other members of the same morphological family) has been extensively investigated by means of the masked-priming experimental paradigm (i.e. Stanners, Neiser, Hernon & Hall, 1979; Rastle, Davis, Marslen-Wilson & Tyler, 2000; Clahsen, Sonnenstuhl & Blevins, 2003; Rastle, Davis & New, 2004; Frost, Kugler, Deutsch & Forster, 2005). This technique focuses on the effect of the (visual) presentation of a stimulus word (the 'prime') on the recognition of a target word. Experimental results indicate that the recognition of the target word is faster when it is preceded by a morphologically related prime (e.g. *kindness/ KIND*), compared to cases where it is preceded by an unrelated word (e.g. *raw/ KIND*) or by an only orthographically similar word (e.g. *kin/ KIND*; *kite/ KIND*). According to Forster, these results show that "the cortical representations of the prime and the target are interconnected or overlap in some way such that the representation of the prime automatically activates the representation of the target word" (Forster, 1999).

On the other hand, the relationship between words with the same suffix and the same morphological schema (in constructional terms), like *kindness/ happiness/ sadness*, has been scarcely investigated yet and results do not allow a consistent and univocal interpretation. Marslen-Wilson et al. 1996 investigated the role of suffixes in English with a cross-modal technique and found a significant priming effect for morphologically related words (e.g. *darkness/ TOUGHNESS*) and no hints of orthographic priming when the overlap did not involve real suffixes (e.g. *darkness / HARNESS*). More recently, Duñabeitia, Perea & Carreiras 2008 found significant facilitation effects on the recognition of suffixed words in Spanish employing a series of experiments with different degrees of prime segmentation: 1) er/ WALKER; 2) %%%%er/ WALKER; 3) baker/ WALKER. The experiments revealed priming effects in all the conditions (independently from the degree of segmentation of the prime) and a clear dissociation between orthographic and morphological priming (e.g. *brevidad* primes *igualdad* but *volumen* does not prime *certamen*). Taken together these results were interpreted as a strong evidence in favor of an early prelexical morphological decomposition (e.g., Duñabeitia et al., 2007; Rastle et

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al, 2004) of all forms that can be potentially split into two "surface morphemes" (see for details Rastle & Davis, 2008) acknowledging to both stems and affixes an equal status of access units during word recognition.

However, when Giraudo & Grainger 2003 addressed this issue using French materials and an experimental design controlling the effect of morphological primes relative to formal primes, results did not show any reliable morphological priming effect, i.e. both priming conditions produced significant priming effects relative to the unrelated baseline but the morphological condition did not yield significantly faster RTs with respect to the orthographic condition. Note that, according to within priming comparisons, the effect of morphological primes is compared to the effect of the orthographic primes on the same targets, e.g., *fumet* 'scent' - *MURET* 'down wall' vs. *béret* 'beret'- *MURET* 'down wall', considering that *fumet* and *muret* share the same functional suffix *–et*, while *béret* and *muret* do not because *béret* is a monomophemic word in French and *ber-* is not a possible stem. Giraudo and Grainger, who conversely found in the same study clear morphological priming effects when manipulating prefixed words, interpreted these asymmetrical results on the base of different semantic and syntactic functions carried by prefixes and suffixes in French. An alternative explanation for the results of Giraudo & Grainger study could be linked to the issue of perceptual salience of suffixes (i.e. their size and segmental-prosodic features) and to the connected degree of suffix likelihood (the probability for a word to be a suffixed word). As a matter of fact, it seems that the more a word ending is salient and functionally consistent, the stronger the probability it is a suffix.

2 The present study

On such premises, in the present research we verify by means of a masked priming experiment and a within-comparison design whether the processing of morphologically complex words is affected by the morphological schema and, more specifically, whether the processing is affected by the formal salience of the suffix.

We choose to run the experiments on Italian not only because Italian has a rich, productive and relatively regular morphology, but also because, being a phonetically 'conservative' language, at least significantly more conservative than French, Italian has relatively long suffixes (e.g. lat. *-ĭttu(m)* > it. *-etto vs. fr. –et*, realized phonetically as [e] as in it. *muretto/*fr. *muret*).

Moreover, as a result of the fact that Italian has undergone little phonological reduction, it has a high degree of orthographic transparency and consistency, which can contribute to the perception and representation of functional word endings (Taft 2003).

Finally, although in Italian the great majority of suffixed words are paroxytone, i.e. stressed on the penultimate syllable, as suffix generally carry the word stress, there is a limited number of proparoxytone words (i.e. stressed on the third to last syllable, with a suffix which does not carry the word stress). Consequently, suffixed words in Italian can have different prosodic contours and suffixes can show different degrees of perceptual prominence at the prosodic level. For these reasons, we considered Italian as an ideal test situation to verify the role of salience on suffixed word processing and access.

More precisely, for our experiments we selected some productive suffixes *–tore*, *–ico* and *-etto* because they show different segmental and prosodic features.

Moreover, they have different degrees of functional consistency, i.e. a different proportion between suffixed and non-suffixed words (i.e. monomophemic words) in a series of words ending with a given letter string (Laudanna et al. 1994). As a matter of fact, while 78% of the words ending with *–tore* and 52,04% of words with *–ico* are suffixed, only 20% of the words ending with *–etto* is suffixed (quantitative data are taken from COLFIS and Derivatario). The criteria according to which we defined the perceptual salience of the suffixes are:

i. **size** of the suffix (number of phonemes and graphemes);

ii. **different degrees of morpho-tactic transparency** (Dressler 1985) and of phonological integration of the suffix to the base, in particular in relation to the phenomenon of:

- resyllabification: no resyllabification takes place with *-tore* which has always two syllables, independently from the root, whereas *–ico*, and *–etto*, starting with a vowel, are more integrated with the stem ([i] and [e] become the coda of the last syllable of the stem (*sto.ria/ sto.ri.co*) and the suffixed word is resyllabified);
- morphological boundary: with *-tore* the boundary of the suffix always coincides with

the boundary of the syllable, whereas with *–ico* and *–etto* the suffix is split in the two last syllables. In the Natural Morphology framework, the more the morphology overlaps with the phonological components (i.e. the higher the morpho-tactic transparency) the easier the recognition;

iii. **word stress**: the suffixes *-tore* and *–etto* always carries the word stress, while *-ico* does not. Moreover, in Italian, the stressed syllable has a long vowel [–'to:re] which, although not phonological, may constitute a perceptual hint for an easier identification. Finally, words with *–tore* and *–etto* show the more frequent stress pattern in Italian (about 80% of the words have the word stress on the penultimate syllable, Thornton, Iacobini & Burani 1997, see Burani & Arduino 2004 and Giraudo & Montermini 2010 on the effect of stress regularity and stress consistency in stress assignment for Italian words).

According to these criteria – *tore* is the most salient suffix and *–etto* is more salient than *–ico*.

In the first experiment we will verify: a) whether words with a perceptually salient suffix like *–tore* are recognized faster than words with a less salient suffix like *–ico*. If this would be the case, the word *lavoratore* should prime *viaggiatore* better than *ironico* primes *metallico*; b) whether a word belonging to a more consistent word ending series (like *–tore*) is recognized faster than a word belonging to a less consistent word ending series (like *–etto*). According to this hypothesis, we expect higher priming effect for words with *–tore* than for words with *–etto*.

The affix condition (our test condition), i.e. the effect of the presentation of a suffixed word as a prime on the recognition of a complex target word with the same suffix (*servitore/ EDUCATORE, sinfonico / NOSTALGICO, boschetto/ PEZZETTO*), will be considered in relation to 3 other conditions: the identity condition (*educatore/ EDUCATORE, nostalgico/ NOSTALGICO, pezzetto/ PEZZETTO*) which should yield the main facilitation effect and consequently the shortest RTs and the unrelated condition (*colomba / EDUCATORE, approccio/ NOSTALGICO, ombelico/ PEZZETTO*) which, on the contrary, is expected to yield the smallest facilitation effect and the longest RTs. These two conditions are considered as baselines to assess RTs obtained in the test condition. Moreover, in the stem condition we will contrast the strength of the connection between words with the same suffix and morphological schema (test condition) with the strength of the connection between words sharing the same stem (*educare / EDUCATORE, nostalgia / NOSTALGICO, pezzo / PEZZETTO*).

In the second experiment we will focus on the issue of the sequential organization of the word, namely that the access and processing of a suffixed word is affected by the position of the suffix at the end of the word and by the (visual) perception of the final part of the word. In order to verify this aspect, we will use the same critical materials as in the first experiment but we will manipulate the location of the fixation point.

Specifically, in the forward mask which precedes the presentation of the prime/target pairs, the fixation marks (####), whose aim is to focus attention on a certain point of the screen, will overlap with the suffix position.

To sum up, our research will contribute to verify the role of suffixes and morphological schemas in the access and processing of Italian complex words and to investigate whether (and possibly to what extent) suffix salience affects such process. Results will indicate if native speakers of Italian organize lexical items according to morphological series as they do according to morphological families.

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