

Morphotactic effects on the processing of Italian derivatives

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Abstract

This paper investigates the processing of Italian affixed forms differing for morphotactic transparency. A lexical decision task with immediate priming was used. Following the principles of morphotactic transparency and Natural Morphology, the priming effect was hypothesized to be stronger for items with a higher degree of morphotactic transparency. However, the predictions were not totally met. The paper discusses possible explanations from the theoretical and methodological points of view, and highlights potential developments of the research.

1 Introduction

According to Dressler (1985, 2005), morphotactic transparency is one of the main parameters within the universal markedness theory of the so-called System-Independent Morphological Naturalness. It assumes the widespread existence of “opacifying obstructions” (Dressler, 2005: 272) in inflectional, derivational or compounding processes, and is expressed by preference degrees along a naturalness scale. The most natural forms are those without opacifying obstructions, followed by those based on mildly opacifying phonological processes (such as resyllabification), while allomorphic rules and suppletion are the most opaque and least natural morphological operations. In this approach, natural is synonymous with cognitively simple, iconic and therefore easy to acquire and process.

This work investigates the native speakers’ processing of Italian affixed forms differing for

morphotactic transparency. Derived forms pertaining to two different classes of morphotactic transparency but matching for length, average frequency, stress pattern, as well as morphosemantic transparency were used as immediate primes in a lexical decision task; the corresponding underived words were used as targets. Following the principles of morphotactic transparency and Natural Morphology, the priming effect was hypothesized to be stronger for items with a higher degree of morphotactic transparency.

2 Morphotactic Transparency

To date, the only database for morphotactic transparency of derivational processes is *derIvaTario*, an open-source annotated lexicon of about 11,000 Italian derivatives (<derivatario.sns.it>; see Talamo & Celata, 2011; Talamo et al., submitted). The lexical source of *derIvaTario* is CoLFIS, *Corpus e Lessico di Frequenza dell’Italiano Scritto* (Bertinetto et al. 2005), a fully lemmatized three-millions word corpus of written Italian, sampled out of a carefully balanced variety of books, journals and newspapers. CoLFIS was created with the purpose of representing the mental lexicon of the ideal Italian speaker – or, more exactly, reader – as reliably as possible (Laudanna et al., 1995).

derIvaTario takes into account several morphological properties of the base and of each affix involved in the derivational cycles, crucially including morphotactic and morphosemantic transparency (see Libben, 1998 and Dressler, 2005 for the latter). With respect to the former, *derIvaTario* provides a value according to the Universal Scale of Morphotactic Transparency (Dressler, 1985 and 2005). The scale values

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range from mt1 to mt8, as shown in Appendix A. The items used in the present experiment belonged to two sets of derivatives, respectively characterized by full transparency (mt1) and relative opacity (mt4).

3 Experiment

3.1 Materials and methods

Adult native Italian speakers participated in a speeded lexical decision task with orthographic stimuli. 32 words and 32 nonwords functioned as targets. Each target (consisting of an underived word) was immediately preceded by a prime in three different conditions: morphological (e.g. *ribellione/ribelle*, ‘rebellion/rebel’), identity (*ribelle/ribelle*) and unrelated (*xxxxxx/ribelle*). Participants saw each target in only one of the three conditions. The test items are listed in Appendix B.

All primes were morphosemantically fully transparent. Half of them were classified as mt1 according to *derIvaTario* (full transparency), the other half as mt4 (with intervening morphophonological opacifying process). The two groups were carefully balanced for: (a) average lexical frequencies of both primes and targets, (b) length of prime and target (as measured by N of phonemes and N of graphemes), and (c) type of base. The last point needs clarification. As is well-known, Italian morphology is not word-based, i.e. the base does not correspond to an actual word. Since *derIvaTario* assumes 7 base types, it was necessary to control for the possible effect of this variable. Only the two most frequent base types were used in the present experiment: (i) root, i.e. an underived word without inflectional ending (e.g. *bellezza* ‘beauty’ as based on the root *bell-* of *bello* ‘beautiful.M.SG.’), (ii) verbal theme, i.e. a verb root plus the thematic vowel (e.g. *battimento* ‘beat’ as based on the verbal theme *batti-* of *battere* ‘to beat’). These two base types were equally distributed within the two word sets: 11 verbal themes, 5 roots.

Nonwords were created by replacing one phoneme in real Italian derivatives and the corresponding underived words. They had the same average length as the test words.

The order of words and nonwords was randomized across participants. Before performing the task, the participants were trained on a list of 8 items (4 words, 4 nonwords).

The priming effect of the derivatives was assessed as the average RT difference between the morphological condition and the identity and unrelated conditions. A statistically significant interaction between priming condition (morphological, identity, unrelated) and morphotactic transparency (mt1 vs. mt4) would suggest that the morphotactic contrast is cognitively salient.

3.2 Results

Repeated measure ANOVAs were run with priming condition as within-subject factor and morphotactic transparency as between-subject factor. The mean results are shown in Table 1. Comparing the morphological and the unrelated conditions, mt1 primes facilitated target recognition to a larger extent than mt4 primes. Similarly, comparing the morphological condition with the identity condition, mt4 primes slowed down target recognition to a larger extent than mt1 primes. Although the general tendency was consistent with the experimental hypothesis, the interaction condition x morphotactic transparency was not significant (Pillai’s trace $F=0.547$, $p > .05$). Thus, although the priming effect exerted by mt4 derivatives onto the corresponding underived words was weaker than the one yielded by mt1 derivatives, the current experiment does not support the initial hypothesis.

Table 1. Average reaction times and differential priming (ms) across conditions and transparency levels.

	identity	morphological	unrelated
mt1	491	547	631
diff.	56	84	
mt4	502	573	637
diff.	71	64	

4 Discussion

The purpose of this experiment was to investigate whether morphotactic transparency is a cognitively relevant factor in the processing of Italian base forms when primed by corresponding derivatives. A significant differential priming effect was expected between mt1 and mt4 primes, which would have lent support to the Universal Scale of Morphotactic Transparency as implemented by *derIvaTario*. The experiment, however, did not produce the expected result, despite encouraging tendencies.

A possible explanation for this result is the strictly on-line character of the technique used

(immediate priming). As Laudanna et al. (2004) have shown for verbal inflection, the effect of complex morphological properties on the processing of isolated words is more likely to be detected in off-line techniques, such as free recall tasks, implying a short-term and/or episodic memory component.

In addition, the assumed difference between transparent and partially opaque derivatives in priming their base forms might surface to a larger extent when the morphological condition is compared with a phonological priming condition (e.g. *colazione/colare* ‘breakfast/percolate’), in which no morphological relatedness is found between the prime and the target, although their formal relationship is the same as in a morphologically related pair (e.g. *formazione/formare* ‘formation/form’). This hypothesis is currently under investigation.

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Luigi Talamo, Pier Marco Bertinetto, and Chiara Celata C. (submitted) DERIVATARIO: An annotated lexicon of Italian derivatives.

Appendix A. Scale of morphotactic transparency.

DEGREE	NATURE OF PHENOMENON
mt1	none
mt2	purely prosodic and phonological (e.g. resyllabification, assimilation)
mt3	phonological, with neutralization of phonetic constituents (e.g. flapping)
mt4	morpho-phonological, without loss of constituents (e.g. articulatory weakening)
mt5	morpho-phonological, with loss of constituents (e.g. deletion)
mt6	purely morphological (e.g. paradigmatic alternation of affixes)
mt7	lexical: weak suppletion
mt8	lexical: strong suppletion

Appendix B. Experimental words.

Mt1		Mt4	
Prime	Target	Prime	Target
<i>disegnatore</i>	<i>disegnare</i>	<i>traducibile</i>	<i>tradurre</i>
<i>bruciatore</i>	<i>bruciare</i>	<i>discutibile</i>	<i>discutere</i>
<i>suggeritore</i>	<i>suggerire</i>	<i>tessitura</i>	<i>tessere</i>
<i>cancellazione</i>	<i>cancellare</i>	<i>competitore</i>	<i>competere</i>
<i>esclamazione</i>	<i>esclamare</i>	<i>emettitore</i>	<i>emettere</i>
<i>dominazione</i>	<i>dominare</i>	<i>roditore</i>	<i>rodere</i>
<i>nuotatore</i>	<i>nuotare</i>	<i>scommettitore</i>	<i>scommettere</i>
<i>accentuazione</i>	<i>accentuare</i>	<i>perseguitabile</i>	<i>perseguire</i>
<i>bollitura</i>	<i>bollire</i>	<i>godibile</i>	<i>godere</i>
<i>piegatura</i>	<i>piegare</i>	<i>cedimento</i>	<i>cedere</i>
<i>fregatura</i>	<i>fregare</i>	<i>spargimento</i>	<i>spargere</i>
<i>intrusione</i>	<i>intruso</i>	<i>rassegnazione</i>	<i>rassegnato</i>
<i>perversione</i>	<i>perverso</i>	<i>concitazione</i>	<i>concitato</i>
<i>ribellione</i>	<i>ribelle</i>	<i>desolazione</i>	<i>desolato</i>
<i>introversione</i>	<i>introverso</i>	<i>discrezione</i>	<i>discreto</i>
<i>avversione</i>	<i>avverso</i>	<i>depravazione</i>	<i>deparavato</i>