Orthographic and Lexical Effects in Neglect Dyslexia: Evidence from Prefixation

Bianca Franzoia, Stefania Laratta, Francesca Franzon and
Carlo Semenza

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Bianca Franzoia[1], Stefania Laratta[2] , Francesca Franzon[3] and Carlo Semenza[4]

[1] Department of General Psychology, University of Padova, Italy

[2] Istituto S. Anna, Crotone, Italy

[3] Neuroscience Area, International School for Advanced Studies (SISSA)

[4] Padova Neuroscience Center, University of Padova, Italy

bianca.franzoia@studenti.unipd.it

Introduction:

Information on lexical representation and processing can be obtained by observing how attention and lexical access interact in Neglect Dyslexia (ND). Spared morpho-lexical knowledge has been shown, indeed, to modulate the exploration of written material in ND (Semenza et. al, 2011; Reznick & Friedmann, 2015). The present study specifically aims at investigating whether and how morpho-lexical variables may modulate reading of prefixed words.

Methods:

Patient ZE, 61 y.o., suffered a tumour lesion in the right posterior temporal lobe. He showed a left hemispatial neglect (BIT conventional: 40/146); additionally, clinical assessment and BIT behavioural (52/81) revealed ND. He was administered 210 prefixed Nouns (N) and 105 Past Participles (P) to read aloud. "Root boundedness" (bound vs. free) and "semantic transparency" (transparent vs. opaque) were considered. Nouns were thus divided in four types: Bound Opaque (BO: *antipatia*-antipathy), Pseudo-prefixed (PP: *antichità*-antiquity), Free Transparent (FT: *antivirus*-antivirus) and Prefixed Non-Words (NW: *antimento*-antichin). Participles types were: Bound Transparent (BT: *condensato*-condensed), Pseudo-prefixed (PP: *continuato*-continued),

Free Opaque (FO: *concentrato*-concentrated), and Prefixed Non-Words (NW: *conpiovuto*-conrained).

Word length, word frequency, type of prefix and prefix frequency were matched across categories. Stimuli were administered singularly in random order at the center of a monitor screen (80 pt.), with no time constraints.

Results:

Confirming his ND diagnosis, ZE made, overall, a much higher number of errors on the left (96%) as compared to the right side (9%). Left sided errors were classified as either *morphological*, when respecting prefix-root boundary (*e.g.,* omission/substitution of prefix), or as *other* when they did not respect it (*e.g.,* partial prefix omission/omission beyond prefix…).

Figure 1
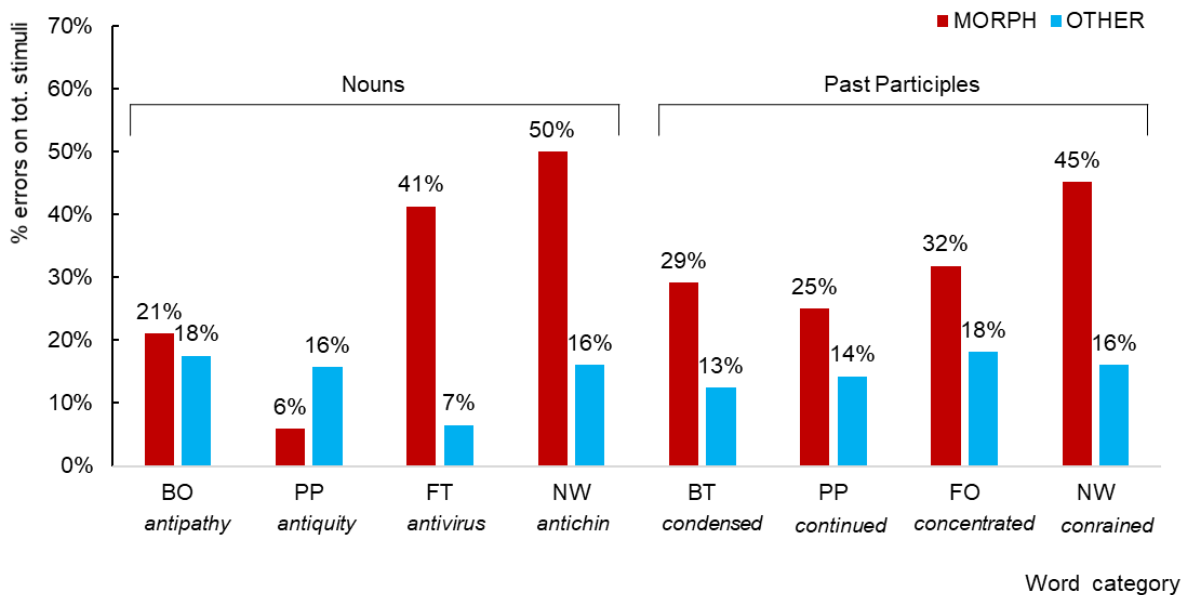
An overwhelming ($\chi^2 = 18.189$, *p*< 0.001) prevalence of *morphological* over *other* errors was observed (Fig.1). Significant differences in distribution of errors across categories were however found ($\chi^2 = 15.075$, *p<0.05*): words likely represented as whole-units (i.e., PP, and, to a lesser extent, BO) showed a lower proportion of morphological errors. In

contrast, words likely stored as parsed (FT) or those lacking a lexical entry (NW), showed the higher rates of morphological errors.

Conclusions:

These results provide evidence that attention to written material is modulated by lexical information and not just by orthographic information. Complex words are thought to engage two different stages in reading (Rastle & Davis, 2008). A pre-lexical *morpho-orthographic* segmentation, based solely on the analysis of orthography, would characterize the earliest stages of visual word perception. If attention is modulated just at this level, the effects of ND would have equally affected all categories of prefixed/pseudo-prefixed words and non-words. *Morpho-semantic* decomposition would characterize later linguistic processing. If attention to written material is, in addition, modulated at this later level, the effects of ND would influence the patient's performance in different word categories unequally: the leftward portion of words that are not decomposed, like PP, or less likely to be decomposed, like BO, would be less easily dropped.

These results, by showing to what extent ND is sensitive to lexical factors engaged in higher-level processing of prefixed words, highlight the complex nature of this disturbance.

References:

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