Bad data in psycholinguistic research on morphological processing

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During the last twenty years, a considerable amount of research has been devoted to the investigation of morphological processing in a psycholinguistic perspective, mainly using the masked priming technique (Forster & Davis, 1984) associated with a lexical decision task. The priming experiments are based on the assumption that the recognition of a word (called ‘target’) is facilitated when its (visual) presentation is preceded by a morphologically related stimulus (i.e., the ‘prime’). This facilitation, which manifests itself in faster reaction times, is interpreted as the consequence of an automatic transfer of activation extracted from the morphologically related prime to the target word. Thus, with native speakers, the brief presentation of a suffixed word (e.g., darkness) before its base (e.g., dark) has been demonstrating to yield recognition times which are similar to those obtained in the identity condition (e.g., dark/dark) or, in any case, significantly faster than those obtained in the unrelated condition (e.g., lazy/dark). Moreover, a significant facilitation is generally observed also with respect to an orthographic condition, i.e. words which are only formally similar but do not share any morphological component (e.g., park/dark), suggesting that the facilitation in the morphological condition cannot be explained in terms of a mere formal overlap between the prime and the target (e.g., Grainger, Colé & Segui, 1991). More specifically, the advantage of using a ‘masked’ prime, i.e. a prime which appears on the screen very quickly, usually for less than 60 ms, a duration which makes the prime virtually invisible for the subjects, is that participants are not aware of the presence of a prime and consequently cannot make use of any memory strategy or metalinguistic reasoning while processing the target stimulus. For this reason, this experimental technique is particularly suited for investigating the automatic and unconscious mechanisms which take place during word processing and lexical access (see Kinoshita & Lupker, 2003 for a review).

In order to assess the reaction times in the different priming conditions (identity, morphological, orthographic and unrelated), the prime masked priming technique is generally associated to a lexical decision task, i.e. participants are asked to decide, by pressing a button on a keyboard, whether the item they are exposed to is a word of the language or not. Therefore, the targets on which subjects have to make a lexical decision are in part real words (which are in different relationships to the prime) and in part non-words, i.e. distractors used for the purpose of the lexical decision task, like exemplified in the Table 1:

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Prime</th>
<th>Target</th>
<th>Prime</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identity</td>
<td>chantier ‘sing’</td>
<td>chantier</td>
<td>burtefier</td>
<td>burtef</td>
</tr>
<tr>
<td>Morphological</td>
<td>chantier ‘singer’</td>
<td>chantier</td>
<td>burtefier</td>
<td>burtef</td>
</tr>
<tr>
<td>Control</td>
<td>chantier ‘building site’</td>
<td>chantier</td>
<td>burfus</td>
<td>burtef</td>
</tr>
<tr>
<td>Unrelated</td>
<td>myrtille ‘blueberry’</td>
<td>chantier</td>
<td>nasvur</td>
<td>burtef</td>
</tr>
</tbody>
</table>

Table 1: word and non-word targets in the LDT

Although this methodology is extensively used in current research and well established among psycholinguists, some aspects of the experimental configuration, depending on the choices of
the researcher, may show a certain degree of variation. As claimed by Forster (1998) “priming effects seem to come and go on an apparently random basis” (p.9). The aim our work here is to explore this issue that can obviously generate bad date when testing masked morphological priming effects. More precisely, our paper discusses cases of conflicting data in psycholinguistic research due to two specific methodological aspects: i) the kind of non-words used for the purpose of the lexical decision task; ii) the proportion between words and non-words in the materials (i.e. the number of fillers as shown by Feldman & Basnight-Brown, 2008; see also Bodner & Masson, 2001; 2003; Bodner, Masson, & Richard, 2006 for evidence of prime-proportion effects on masked priming).

As for the non-words, we will look at results obtained in experiments examining masked morphological priming effects in French while varying the structural characteristics of the non-word targets, specifically:

i) simple non-words (i.e. word without any specific morphological structure, which do not contain a genuine stem or suffix, e.g., Fr. *burte*);

ii) semi-complex non-words made up of non-existing stems and existing suffixes (e.g., Fr. *ort-ier*);

iii) semi-complex non-words made up of existing stems and non-existing suffixes (e.g., Fr. *art-oix*);

iv) complex non-words constructed with illegal combinations of existing stems and suffixes (e.g., Fr. *artier*).

After the review of the bad data in the literature, we discuss the results obtained in a series of masked priming experiments which we carried out in order to demonstrate that different kinds of non-words modulate the priming effects on true word targets. Precisely, whereas positive morphological priming effects on word recognition were observed using simple or partially complex non-words (e.g. non existing stem + true suffix), no priming effects were found when morphologically complex non-words (e.g. illegal combinations of existing stems and existing suffixes) were used. Therefore, these conflicting results with the same critical items (significant morphological priming effects with one kind of non-words and no effect with other kinds of non-words) show that the structure of the non-words influences lexical decision latencies on true word targets. This point seems essential to us because it suggests that the morphological effects that we observe in general in the masked priming experiments depends not only on the relationships between prime and target words but, crucially, also on the ‘context’ in which these effects are obtained.

The implication of our claim is that when we consider and compare results obtained within this experimental framework, it is fundamental to control the kind of non-words used as distractors.

References


