Syntactic Accuracy in Sentence Production: The Case of Gender Disagreement in Italian Language-Impaired and Unimpaired Speakers

Gabriella Vigliocco\textsuperscript{1,3} and Tiziana Zilli\textsuperscript{2}

We report three experiments with language-impaired and unimpaired speakers of Italian, assessing: (1) whether nonsyntactic (both conceptual and morphophonological) information is used in encoding the syntactic structure of a sentence; and (2) whether the integration of syntactic and nonsyntactic information can be differentially impaired in Broca's aphasics. In all the experiments, gender agreement errors between a noun, subject of the sentence, and a predicative adjective were induced by presenting participants with sentence fragments to complete. The first experiment assessed the role of conceptual information. The second experiment investigated whether agreement is disrupted by the presence of another noun with different gender in the subject noun phrase. In the last experiment, we assessed whether morphophonological cues are used. We found that both populations used nonsyntactic information (both conceptual and morphophonological). However, patients were disrupted to a greater extent than normals by the presence of a gender mismatching noun in the subject noun phrase. The results are discussed in terms of how information integration during production is achieved and how it can be disrupted in aphasia.

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\textsuperscript{1} University of Wisconsin–Madison.

\textsuperscript{2} University of Padova.

\textsuperscript{3} Address all correspondence to Gabriella Vigliocco, Department of Psychology, University of Wisconsin, 1202 W. Johnson St., Madison Wisconsin 53703.
To fulfill its communicative goal, the sentence production system must succeed at multiple levels. These include meaning, syntax, morphology, phonology, and motor commands. There are ample opportunities for sentences to be ill formed at any of these levels. However, as estimated by Bock (1991), errors in production do not exceed 1 in 1,000 words. This level of accuracy is remarkable for a system that produces two to three words per second (Levelt, 1989).

In this paper we will focus on accuracy in realizing a syntactic representation for a sentence; more specifically, on accuracy in realizing agreement between two elements in a sentence. The questions we address are: first, whether nonsyntactic information, both conceptual and morphophonological, is used in production to ensure accuracy during grammatical encoding (i.e., those processes responsible for building syntactic representations for to-be-uttered sentences). Second, whether the integration of syntactic information across constituents and the integration of nonsyntactic and syntactic information during encoding can be differentially disrupted in Broca's aphasia.

Agreement relations between sentential elements are particularly well suited for addressing these questions. First, agreement is a syntactic operation that reflects conceptual features (e.g., the sex of a referent). Second, it is a syntactic relation that is realized in languages through morphophonological markers. Furthermore, questions about the use of agreement are directly relevant for many linguistic theories (e.g., Bresnan, 1982; Pollard & Sag, 1994) because the mechanisms underlying agreement are also used for other constraints (e.g., to determine the permissibility and placement of arguments). They are also relevant for many computational and psycholinguistic theories of both parsing and production (McDonald, Pearlmutter, & Seidenberg, 1994; Kempen & Vosse, 1989; Kempen, 1997; Vigliocco, Butterworth, & Garrett, 1996).

Gender agreement between a noun, subject of a sentence, and a predicative adjective in Romance languages seems to be a perfect example. In Italian, nouns are always marked for gender (either masculine or feminine). For most nouns referring to humans, the gender marking is determined by the sex of the referent. The reference to male or female entities is achieved by changing the word ending; for example, ragazzo (boy) and ragazza (girl). Nouns of this type are referred to as having conceptual gender. For nouns referring to objects and abstract entities, gender is largely arbitrary (so that, for example, pietra (rock) is feminine while sasso (stone) is masculine.) Nouns in this category are referred to as having grammatical gender. For a large number of animal names, a single form (either feminine or masculine) is used to refer to both sexes [e.g., scimmia (monkey-F); gufo (owl-M)]. A few nouns referring to humans also belong to this latter class [e.g., vittima (victim-F)].