THE TIME COURSE OF ATTACHMENT DECISIONS: EVIDENCE FROM FRENCH

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For more than 15 years, research in the field of human sentence processing has focussed on this sole question: how are syntactic ambiguities dealt with? In this chapter, I am going to summarize a series of recent experiments conducted in French, whose aim was to (modestly) contribute to the debate. Let us first briefly consider the solutions that have been proposed so far:

1. Solution (a): The different possible structures are processed in parallel, together with other sources of information.
2. Solution (b): The choice is postponed until more information is available.
3. Solution (c): The parser forces the decision (e.g., in favor of the simplest structure).

Solution (a) has recently received considerable attention in the framework of the constraint satisfaction approach of sentence comprehension (MacDonald, Pearlmutter, & Seidenberg, 1994). As for solution (b), a formal framework is provided by the Decription Theory (D-theory) developed by Marcus, Hindle, and Fleck (1983) (see also Perfetti's, 1990, pieces parser). Although different on many critical aspects, solutions (a) and (b) share the assumption that syntactic parsing is basically a lexically driven process, in which chunks of syntactic structures, or subtrees, are generated on-line while a sentence is being parsed. Moreover, in both types of models, these chunks are assumed to combine with thematic information (e.g., concerning the possible argument structures and thematic girds associated with each lexical item) in order to form a complete syntactic structure.
As emphasized by Frazier (1987), solutions (a) and (b) are likely to raise a serious problem in terms of resource requirements (since memory capacity for unorganized materials is known to be limited). By contrast, the memory requirement is minimal in the case of solution (c) since each incoming item is assumed to be immediately integrated in a unique syntactic structure. In Frazier's garden-path model (Frazier, 1987; Frazier & Rayner, 1982), this is achieved by means of two parsing heuristics: minimal attachment (do not postulate any potentially unnecessary nodes) and late closure (if grammatically permissible, attach new items into the clause or phrase currently being processed). For example, in sentence (1) below, the late-closure principle states that the relative clause “who...” will be preferentially attached to the second noun in the “N1-of-N2” construction (the actress, not her servant, was on the balcony).

(1) Someone shot the servant of the actress who was on the balcony with her husband.

Although this may be true as far as English is concerned (Cuetos and Mitchell, 1988), the reverse effect has, in fact, been found in a variety of languages ranging from Spanish (Cuetos and Mitchell, 1988) to Dutch (Brysbaert and Mitchell, 1996a). Frazier and Clifton's (1996) answer to these studies was to propose a distinction between two types of attachment procedures, corresponding to two types of syntactic relationships. Although primary relationships (basically the relations between a main verb and its various arguments within a single clause) would still be submitted to minimal attachment and late closure, the processing of nonprimary relationships, such as relative clauses (RC), would rely on different principles. Instead of being attached in a fully determinate syntactic representation, nonprimary relationships are assumed to be associated with an entire theta domain, until a decision can be made on the basis of semantic and pragmatic factors. In fact, Frazier and Clifton's (1996) proposal amounts to applying solution (b) to a certain class of sentences while maintaining solution (c) for another class.

Such a half-way position is somewhat unsatisfactory, and one can be tempted to go one step further, by applying solution (b) to primary relationships as well (see the last three sections of this chapter). Another (obvious) solution, if one wishes to maintain a unified view of sentence processing, consists in going along with solution (c) for both primary and nonprimary relationships. This approach, which assumes that all types of attachments are decided at the syntactic level, is explored in section 1.

1. RELATIVE CLAUSE ATTACHMENT

This section further examines the nature of the bias (if any) favoring high attachment for sentences like (1) above. According to Frazier and Clifton's (1996)