

Second position and the prosody-syntax interface

Tina Bögel

University of Konstanz

Miriam Butt

University of Konstanz

Ronald M. Kaplan

Microsoft

Tracy Holloway King

Microsoft

John T. Maxwell III

PARC

In a recent paper Bögel et al. (2009) outlined a new architecture for modeling the interaction between prosody and syntax. Rather than the co-description approach first suggested by Butt and King (1998), Bögel et al. propose a pipeline arrangement of components in which prosodic information is developed in a module that operates independently of the syntax while still allowing for syntactic rules and preferences to be conditioned on prosodic boundaries and other features. This is made possible because the terminal string of the syntactic tree (the LFG c-structure) is a sequence of lexical formatives intermixed with elements inserted by the prosodic component. This architecture allows for misalignments between prosodic units and syntactic constituency because syntactic rules can simply ignore prosodic information that would otherwise disrupt syntactic patterns. But it also incorporates a Principle of Prosodic Preference that causes syntactic structures that do not coincide with prosodic boundaries to be dispreferred.

By way of illustration, Bögel et al. show how this new architecture provides for an insightful account of bracketing misalignments between the prosodic units of spoken English and syntactically motivated phrase structures. They also give an account of the bracketing misalignment exhibited by the Urdu clitic *ezafe*. The clitic *ezafe* attaches prosodically to a preceding host but it functions syntactically as an element of a following phrase (Bögel et al. 2008).

The present paper explores how the pipeline architecture can be applied to an additional class of syntax-prosody misalignments, the second position clitics that appear in many languages. Second position clitics have presented a challenge to many if not all theoretical frameworks, and there is a substantial literature on the subject (e.g. Halpern and Zwicky 1996, Franks and King 2000 and references therein). The crucial aspects of the problem, from an architectural point of view, are demonstrated by the following example from Serbian/Croatian/Bosnian (SCB):

- (1) [Taj joj ga je čovek] poklonio.
That her it AUX man presented
'That man presented her with it.' (Schütze 1994)

The clitic sequence *joj ga je* surfaces as an interruption between the demonstrative *Taj* and the head noun *čovek* of what would otherwise be an ordinary initial NP, and those clitics contribute feature and argument information not to the interpretation of the NP that they are contained within but to the clause enclosing that NP. Layered on top of these syntactic issues is the interaction with prosody: these clitics appear in the second position of a prosodic unit without regard to syntactic alignments. This is illustrated by the prosodic bracketing in (2):

- (2) (((((Taj)_w joj)_{cl} ga)_{cl} je)_{cl} (čovek)_w)_p (poklonio)_p
That her it AUX man presented
'That man presented her with it.'

In our account of this phenomenon the syntactic and prosodic components have a shared responsibility: the syntactic component deals with the clausal scope of functional information while the prosodic component provides for proper placement. In keeping with the Bögel et al. (2009) architecture, the components are coordinated by virtue of a limited amount of information visible on a commonly accessible string. In particular, the shared string carries a distinctive mark, notated as LB_S , by which the left-boundaries of syntactic clauses are made known to the prosody.

We start with the observation that clitics would naturally have clausal functional scope if they appeared as immediate daughters of the clause node in the syntactic c-structure. This can be achieved by

a simple extension of the c-structure rule that derives the normal patterns of clausal daughter sequences, as schematized in (3).

$$(3) S \rightarrow LB_S \quad (CCL) \quad [...]$$

$$\quad \quad \quad \uparrow=\downarrow$$

Here, LB_S is the clausal left-boundary marker, the optional CCL covers the set of clitic sequences that can appear in second position, and [...] denotes the usual expansion of the clausal S category. The features of the clitics apply to the clausal f-structure by virtue of the $\uparrow=\downarrow$ annotation.

We rely on the prosodic component to provide a mapping that correlates the clitics in the c-structure terminal string with their attested realization after the first prosodic word. The clitics are thus inverted in the prosodic representation so that they are realized in second position and can therefore attach to a prosodically acceptable host. Since the clitics are drawn from a given set of lexical/prosodic formatives and since they cluster according to a fixed set of patterns, we know that there are only a finite number of clitic sequences that are subject to the inversion mapping. This fact enables us to provide a characterization of the inversion mapping within the formal space of regular relations. Suppose CS in (4a) denotes the finite set of clitic sequences, the lexical/prosodic sequences that can be realizations of the CCL category (e.g. CS_1 for SCB might be the string *joj ga je*). Also let W stand for any prosodic word, presumably marked by distinctive prosodic-word brackets. Then the inversion mapping is the regular relation denoted by the expression (4b):

$$(4) \text{ a. } CS = \{CS_1, CS_2, \dots, CS_n\}$$

$$\text{ b. } [\overline{\Sigma^* LB_S CS \Sigma^*} (\cup [LB_S CS_i:0 \ W \ 0:CS_i])]^*$$

$$\quad \quad \quad CS_i$$

In this traditional notation (see Kaplan & Kay, 1994) the term Σ^* stands for any number of prosodic items, and complementation is indicated by the overline. The overlined term thus describes the identity map on all strings that do not contain any of the clause-initial clusters. If a clause-initial cluster does appear, it must be treated by one of the expressions inside the optional union on the right. The term $CS_i:0$ indicates that there is nothing (0) on the prosodic side of the map corresponding to a particular cluster on the syntactic side. The following prosodic word W is unchanged in the mapping. After that word the term $0:CS_i$ indicates that that same i^{th} cluster appears on the prosodic side corresponding to nothing on the syntactic side. The effect is that strings with syntactically clause-initial clitic sequences are mapped to strings where those particular clusters appear on the other side of an adjacent word.

We thus provide a simple account of second position clitics as a minor variation within the general Bögel et al. (2009) architecture for the interface of prosody and syntax and without extending the formal power of LFG. The architecture allows syntactic and prosodic constraints to govern the distribution and interpretation of second-position clitics by applying in parallel to a limited amount of shared information.

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