The Prosody of Second Position Clitics and Focus in Zagreb Croatian*

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It is well known that in Serbo-Croatian (SC), second position (2P) clitic placement can alternate between after the first syntactic constituent (1C) and after the first phonological word (1W). This alternation has become a textbook example for the interaction between syntax and phonology and an impetus for proposals challenging standard accounts of the syntax-prosody interface.

This paper draws attention to the details of the alternation in 2P clitic placement itself. It is about the interaction of prosody, focus, and alternation in second position clitic placement in Zagreb Croatian; it is the first systematic instrumental study on the prosody of 2P clitics in SC and the first study of 2P clitics in SC to emphasize the role of pragmatics in clitic placement.

We suggest that the 1W clitic placement may inherently be associated with focus, according to native speaker intuitions and based on differences in tonal alignment in the prosodic realization of the two different clitic placements. In addition, contrary to the predictions of Radanović-Kocić (1988, 1996), we find no evidence for a prosodic break right-aligned to the edge of a sentence-initial narrowly focused element, before a 1W clitic string. The absence of such a break implies that, under an edge-aligned syntax-prosody mapping, prosodic phrasing cannot provide direct evidence for split construction accounts of 2P clitic placement after the first phonological word.

1 Introduction and background

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1.1 Distribution of second position clitics in Bosnian/Croatian/Serbian
While SC is a free word language, the distribution of SC enclitics is very restricted: they must come in the 'second position' of the sentence, as in (1), and are thus called 2P clitics. Moreover, multiple 2P clitics within a clause must be string-adjacent and traditionally occur in a specific order, shown in (2): first comes the question particle *li*, followed by all auxiliary clitics except *je*, then the pronominals, the reflexive clitic *se*, and finally *je* (Franks and King 2000).

(1) Ivan *je* pio pivo.
Ivan is drink beer
'Ivan drank beer.'

(2) *li* < AUX except *je* < DAT < ACC < GEN < *se* (REFL) < *je*

While 2P clitics occur in several Slavic languages, as well as in other languages such as Sanskrit, Pashto, Tagalog, and Warlpiri (Bošković 2001, Halpern 1995), SC is one of the few languages and only modern Slavic language that allows two, quite freely alternating placements for 2P clitics in subject-initial sentences, as shown in (3) (Browne 1974). In (3a), the 2P clitic comes after the entire DP. However, in (3b), it comes after the determiner.

(3)
a. after the first constituent (1C)
[Taj čovjek]$_{DP}$ *je* pio pivo.
That man is drink beer
'That man drank beer.'
b. after the first (phonological) word (1W)
Taj *je* čovjek pio pivo.

The optionality between the two placements, either after the first constituent (1C), as in (3a) or after the first phonological word (1W) as in (3b), has inspired many accounts reconciling both syntactic and phonological factors in 2P clitic placement. On the one hand, data showing that 2P clitics cannot always be placed after the first phonological word indicate that phonology alone cannot determine 2P clitic placement (Halpern 1995, Progovac 2005). On the other hand,

evidence that 2P clitic placement is sensitive to prosodic breaks indicate that syntax alone cannot provide a full account of how the clitic placement is conditioned (Radanović-Kocić 1988, 1996, Zec and Inkelas 1990).

In the existing work on the interaction of prosodic phonology and 2P clitic placement, there are no published instrumental studies on the prosody of 2P clitics. Also, alongside the syntactic and prosodic work on 2P clitics, there has been very little attention to the interaction of pragmatics with 2P clitic placement in the literature. This study is an initial step towards filling these gaps and explores the interaction of alternation in 2P clitic placement, focus pragmatics, and prosody. The prosodic analysis is based in the autosegmental-metrical framework of intonation (Ladd 1996, i.a.).

1.2 Focus and second position clitic placement in SC

In the literature and according to some of our consultants, the 1W placement is more marked than the 1C placement—it is more formal, literary, and old-fashioned (Browne 1974, Halpern 1995). Furthermore, anecdotal evidence from SC linguists and our consultants suggests an interaction between focus and clitic placement: for most, 1W placement is particularly (and for some, only) natural if the word preceding the clitic string is narrowly rather than broadly focused[1]; some also report that 1W placement is most natural if either the word preceding or following the clitic string is narrowly focused. Thus, our first and most general hypothesis for our speakers was (4):

(4) *Hypothesis 1: 1W placement is inherently associated with focus.*

1.2.1 Focus prosody and second position clitic placement in SC

Because of the hypothesis in (4) and since literature on SC prosody has found that SC can mark focus prosodically (Godjevac 2000, 2005, Smiljanić 2004), we also proposed the following general hypothesis regarding prosody in (5):

[1] We define the broad focus reading of a sentence as the reading where the sentence contains all new information and the narrow focus reading as the reading where an element in the sentence requires corrective or contrastive focus. See (14) and (15).

(5) *Hypothesis 2: 1W placement and 1C placement have different prosodic realizations.*

Smiljanić (2004) conducted a production study with disyllabic target word nouns followed by the clitic *je* in sentences which had the structure $[N]_{DP}$ *je* V {Obj, Adj} as in (6) below and in the schematic representation in Figure 1. The sentences were elicited in broad focus and with narrow focus on the subject DP.

(6) $[\text{Mama}]_{DP}$ *je* jela bananu.
Mama is eat banana
'Mama ate a/the banana.'

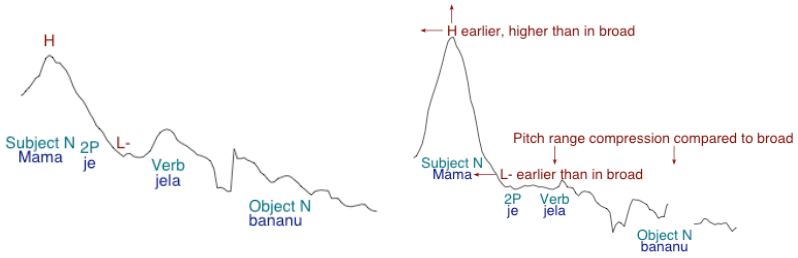

Figure 1. Schematic representations of (6) under broad focus (left) and under narrow focus on the subject noun (right). Key markers of narrow focus include retraction and higher peak height of the pitch peak (marked H) in the focused element and retraction of the low target (marked L-) and post-focal deaccenting/pitch range compression following the focused element.

In Smiljanić (2004), focus on the subject noun was realized by: lengthening of the stressed vowel in the noun, retraction of the low tonal target before the peak H preceding the noun, retraction and raising of the pitch peak in the noun, and a lowered and retracted low tonal target L- following the noun.

Since languages can show a tradeoff between prosodic and syntactic marking of narrow focus, i.e. a tradeoff between cues from tonal alignment and word order (Face and D'Imperio 2005), with the assumptions that 1W placement signals focus by split subject DP word order and that 1W placement is inherently associated with focus, (4), we hypothesized more specifically from (5) the following in (7).

(7) *Hypothesis 2: 1W placement and 1C placement have different prosodic realizations.*
Hypothesis 2a: There is less or no prosodic marking of narrow focus on the first word for 1W compared to 1C placement.
Hypothesis 2b: There is prosodic focal marking present in broad focus for 1W compared to 1C placement.

1.2.2 Syntactic/prosodic break before 2P clitic string for 1W constructions?

Particularly of interest for our studies was that in Smiljanić (2004), the low tone immediately following the pitch peak in the noun, L-, was retracted from after the clitic to before the clitic in narrow focus on the subject noun, as shown in Figure 1 and in (8). Godjevac (2000, 2005)'s findings agreed with this L- placement in narrow focus, and she proposes a zero phrase accent Ø- at the right edge of the focused element inducing post-focal pitch range compression.

(8) Retraction of L- in narrow focus on subject noun in Smiljanić (2004)
Broad focus : N *je* **L-** V Obj
Narrow focus: $[N]_{FOC}$ **L-** *je* V Obj

Thus, we hypothesized the tonal retraction in (9) for 1W placement with DP subject-initial sentences:

(9) *Hypothesis 3: The L target following the adjective is retracted as follows for 1W placement:*
Broad focus : Adj *2P clitics* **L-** N V
Narrow focus: $[Adj]_{FOC}$ **L-** *2P clitics* V

The presence of a L target intervening between the adjective and clitic string in narrow focus would be of interest because of the common split construction proposal of 1W placement implying a syntactic boundary at that same point, and because of phonological evidence from Radanović-Kocić (1988, 1996) placing a phonological break at the same point.

A number of syntacticians have analyzed the 1W placement as a split construction, no different than the left branch extraction shown in (10)

from Wilder and Ćavar (1994) below (Bošković 2001, Progovac 2005, Wilder and Ćavar 1994).

(10) Left branch extraction
a. Ivan *je* kupio zeleni auto.
Ivan is buy green car
'Ivan bought a green car.'
b. **Zeleni** *je* Ivan kupio **auto**.
Green is Ivan buy car
'Ivan bought a green car. /
'It was a green car that Ivan bought.'

(10a) shows default word order while (10b) shows word order after extraction: the adjective has been moved before the 2P clitic. In (10a), *zeleni auto* 'green car' is not split and is a syntactic constituent, but in (10b), *zeleni* has been extracted to sentence-initial position. Similarly, for 1W placement in (11), *taj* has been extracted to sentence-initial position.

Interestingly, split constructions have been analyzed as being associated with contrastive focus (Bašić 2004, Pereltsvaig 2008), and Progovac (2005) proposed that the gloss for the split constructions in (9b) and (11) should reflect this.

(11) **Taj** *je* **čovjek** pio pivo.
That is man drink beer
'That man drank beer.' /
'It was that man that drank beer.'

The syntactic break after the focused element from extraction discussed above matches with the location after focused elements where Radanović-Kocić (1988, 1996) proposed phonological breaks (marked as '|' below) which block degemination in /mo**jj**organ/→ [mo**j**organ], in (12a), as opposed to in (12b). For Radanović-Kocić, 1W placement is acceptable only after a focus-induced break with focus on the word preceding the 2P clitic, as in (13a), and not if focus is on the word following the 2P clitic, as in (13b).

We ran two production experiments investigating the interaction of 2P clitic placement, focus, and prosody, testing the hypotheses in (5), (7), and (9). Our first and main experiment varied clitic placement, clitic

(12) Degemination is blocked after a focus-induced break

a. MOJ | jorgan *je* od perja. /mo**jj**organ/ ↛ [mo**j**organ]
My comforter is of down
`MY comforter is made of down.'

b. Moj JORGAN | *je* od perja. /mo**jj**organ/→ [mo**j**organ]
My comforter is of down
`My COMFORTER is made of down.'

(13) 1W placement allowed after focus-induced break

a. MOJ | *je* jorgan od perja. (1W)
b. *Moj *je* JORGAN | od perja. (1W)

string length, and focal domain in stimuli with sentence-initial subject Adj-N DPs, e.g. Adj *2P clitics* N V (1W) and Adj N *2P clitics* V (1C). A second experiment varied word length in a sentence-initial target word followed by 2P clitics *me je* under broad focus and narrow focus on the target word to investigate alignment of the L- target hypothesized in (9).

2 Experiments

2.1 Subjects

The subjects of this study were four Zagreb Croatian native speakers living in Los Angeles, California, labeled arbitrarily as S1-S4 (3 female, aged 39, 41, 60; 1 male, aged 61). While the speakers had been living in the United States for about fifteen years, all grew up and lived in Zagreb until at least their mid 20s and continue to speak Croatian currently.

The dialect of Zagreb Croatian was chosen: (i) to minimize the effect of lexical pitch accents on prosody of the recorded utterances, and (ii) to have speakers comfortable with and accustomed to using 1W placement. SC is traditionally described as a language with lexical pitch accents, but Smiljanić (2004) found that Zagreb Croatian speakers neutralize pitch accent contrasts, utilizing stress accents rather than lexical pitch accents. Moreover, at least in journalistic prose, 1W placement is more frequent in Standard Croatian than Standard Serbian (Alexander 2008).

2.2 Stimuli/procedures

The sentences in the first experiment consisted of target sentence-initial subject DPs with trisyllabic initially stressed C[a]CVCV adjectives and

nouns followed by pronominal and auxiliary clitics *me* and *je*. The factors were CLITIC PLACEMENT (1C, 1W) x CLITIC STRING LENGTH (1, 2) x FOCUS (broad, narrow on the adjective): (2 x 2 x 2) x 4 items x 5 repetitions for a total of 160 tokens + 65 fillers. The stimuli for the second experiment were also interspersed. This second experiment investigating the alignment of the L- target had the factors WORD LENGTH (1, 2, 3, 4 syllables) x FOCUS (broad, narrow): (4 x 2) x 6 items x 3 repetitions for a total of 144 tokens.[2]

Subjects were presented with slides with question/answer pairs. They were asked to read the slide silently and then read the answers out loud and were recorded onto a laptop at 22 kHz/16 bit through an external headworn Logitech Premium USB Headset 30 in a quiet room. A broad focus and a narrow focus question/answer pair for Experiment 1 is given in (14) and (15), and an example for Experiment 2 is given in (16).[3]

(14) Broad focus example, 1 clitic/1C

a. Što *se* događa?
what self happen
'What's happening?'

b. Manjina malina *me* mami danas.
Manja$_{POSS}$ raspberry me entice today
'Manja's raspberry is enticing me today.'

(15) Narrow focus example, 2 clitics/1W

a. Je *li* *Vas* Lukina malina Mamila?
Is Q you Luka$_{POSS}$ raspberry Entice
'Did Luka's raspberry entice you?'

b. (Ne,) MANJINA *me* *je* malina mamila.
(No,) Manja$_{POSS}$ me is raspberry entice
'(No,) MANJA's raspberry enticed me.'

(16) Experiment 2 example, 2 syllable word, narrow focus

a. Je *li* *Vas* tata nasamario?
Is Q you dad deceive

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[2] For Experiment 2, tokens for 3 syllable words were reused from Experiment 1 tokens which included the clitic string *me je.*

[3] All stimuli are listed in the Appendix in Yu (2008).

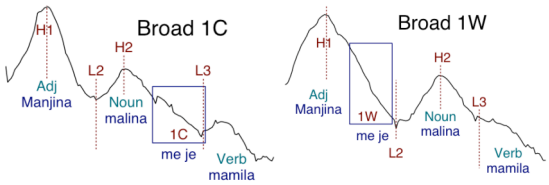
'Did Dad deceive you?'

b. (Ne,) Mama *me* *je* nasamarila.
(No,) Mama me is deceive
'(No,) MAMA deceived me.'

2.3 Analysis

The sentences were segmented and labeled for F0 landmarks using a wide band spectrogram supplemented by a waveform display and a F0 pitch track and analyzed for segment durations and timing and intonational parameters using Praat (Boersma and Weenink 2007) and statistical analyses were carried out in R (R Development Core Team 2007). Tonal landmarks, shown in Figure 2, were labeled for each utterance from extrema in the F0 contour: peaks H1 and H2 and valleys L2 and L3.[4] These were named simply by order of occurrence in the speech signal, without reference to potential differences in prosodic function of the tonal targets in broad and narrow focus, and they are not intended to be labels directly corresponding to intonational pitch accent types, but simply phonetic annotations describing the F0 contour.

The statistical analyses performed were fixed-effects ANOVAs (CLITIC PLACEMENT, FOCUS, and CLITIC STRING LENGTH as fixed factors in Experiment 1, WORD LENGTH and FOCUS in Experiment 2) for each speaker, with the dependent variables being vowel durations, F0 values, and alignment of the tonal targets. For Experiment 2, correlational analyses were also performed between tonal target alignments and with segmental landmarks; these were done using nonparametric Spearman rank-order correlations with added jitter.



[4] We also measured L1, the valley preceding H1 at the onset of the utterance, but did not analyze it because of the large number of stimuli with sentence-initial voiceless stops.

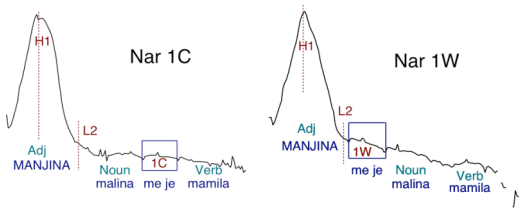


Figure 2. Schematic representation of labeled tonal targets for data analysis across CLITIC PLACEMENT and FOCUS conditions for sentences like (15b). The location of the 2P clitic string is boxed. In narrow focus, H2 and L3 (not shown) were not labeled on the basis of the F0 contour because of the post-focal pitch range compression; H2 was labeled at the offset of the second vowel in the noun and L3 at the offset of the first vowel in the verb for F0 comparisons between focus conditions.

3 Results and discussion[5]

We first present representative intonational contours in Section 3.1, and then address the prosodic realization of narrow focus, relevant to Hypotheses 2a and 3 in (7) and (9), in Section 3.2, and finally, discuss differences in the prosodic realization of 1C and 1W placements in broad focus, relevant to Hypothesis 2b in (7), in Section 3.3.

3.1 Representative intonational contours

We show some representative intonational contours below for sentences like (15b). Note in broad focus, that for 1W (on the right) compared to 1C (on the left), the alignment of the low target L2 is different, consistent with Hypothesis 2b in (7). For 1C, L2 occurs after the onset of the noun *malina* but for 1W, it occurs in the clitic string before the noun onset.

The realization of narrow focus shown in the bottom row is similar to that found in Smiljanić (2004). However, note that the low target L2 discussed in (8) and (9) does not fall at the right edge of the focused sentence-initial element *Manjina*, but before the end of the focused element, for both 1C (on the left) and 1W (on the right) clitic placements, inconsistent with Hypothesis 3 in (9).

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[5] Due to space constraints, we present only main results in this paper; further details and quantitative results can be found in Yu (2008).

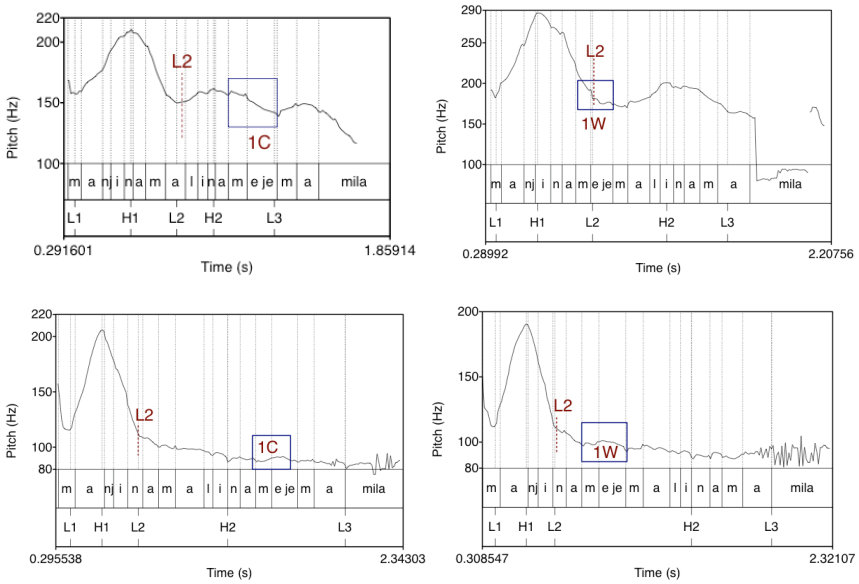

Figure 3. Representative intonational contours. Top left: broad focus, 1C, S4. Top right: broad focus, 1W, S1. Bottom left: narrow focus on adjective, 1C, S2. Bottom right: narrow focus on adjective, 1W, S2.

3.2 The realization of narrow focus

The prosodic realization of narrow focus is schematized below in Figure 4, comparing the pitch contour for broad focus on the left and narrow focus on the adjective on the right.

We found that Hypothesis 2a in (7) was not supported: there was no evidence for a tradeoff between prosodic and syntactic marking of narrow focus between 1C and 1W placements. There were no significant differences in durations, F0 values, or tonal alignment between 1C and 1W placements in narrow focus on the adjective.

In addition, Hypothesis 3 in (9) was not supported: there was no evidence for a prosodic boundary before the 2P clitic string for 1W constructions in narrow focus on the adjective. While we expected the low tonal target to fall at the right edge of the focused element, as predicted by Radanović-Kocić (1988, 1996), Godjevac (2000, 2005), and Smiljanić (2004), we found instead that it was not a boundary tone, as

shown in Figure 5, which shows results of the alignment of this low tone L2 in narrow focus across target word lengths from Experiment 2.

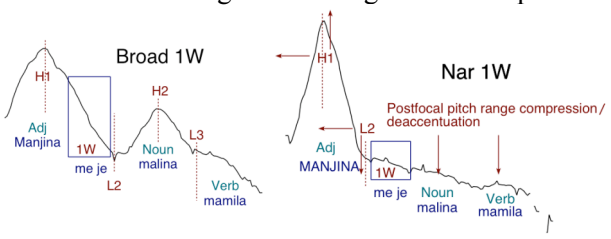

Figure 4. Schematic representation showing the prosodic realization of narrow focus on the adjective. Compared to broad focus, shown on the left, in narrow focus, the pitch peak on the adjective (H1) is retracted and higher, and there is postfocal pitch range compression/deaccentuation following the low target L2, which is also retracted.

From Experiment 2, ANOVAs and correlation analyses suggested that the low target following a narrowly focused sentence-initial element (L2) trailed the adjective peak (H1) and/or onset of the stressed vowel in the adjective at a fixed duration for each speaker.[6] In other words, the L tone is not a boundary tone marking the end of a focused word. Instead, its function seems to be to enhance the F0 peak or the falling pitch by being near the peak. Since this tone is attracted to a stressed syllable, i.e., the peak, and since it controls the intonational contour over the post-focus string, we interpret this tone to be a focal phrase accent, as suggested by Godjevac (2000, 2005). We found that the alignment of this focal phrase accent did not interact with clitic placement at all.

3.3 Differences in prosodic realization of 1C and 1W in broad focus

While we found no significant differences in the prosodic realization of narrow focus between clitic placements, we did find differences between clitic placements in broad focus, consistent with Hypothesis 2b in (7).

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[6] See Section 3.2.2.2 in Yu (2008). For three speakers, there were no significant effects of WORD LENGTH on alignment between L2 and H1, and L2 and the onset of the stressed vowel in ANOVAs. Spearman's rank correlation coefficients for correlation of the alignment of L2 and H1, and L2 and onset of the stressed vowel, ranged from 0.53 to 0.88.

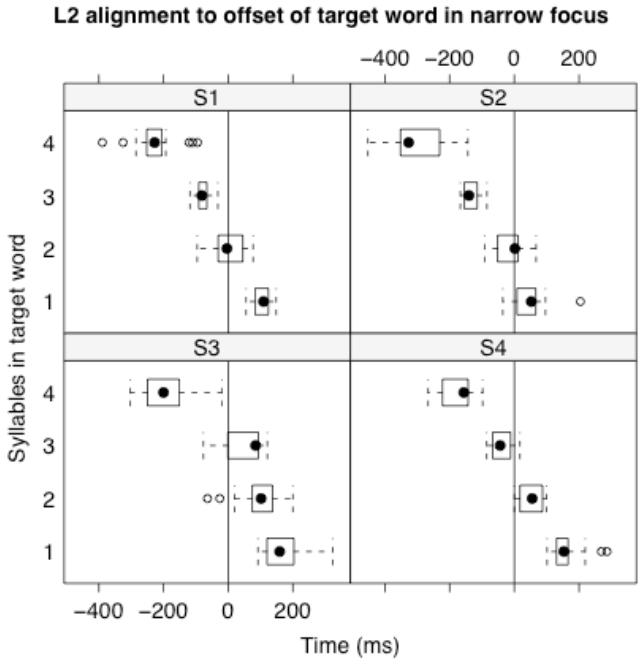

Figure 5. Alignment of the L2 low target following the narrowly focused sentence-initial target word to the offset of the target word (indicated by the vertical line at x=0) for all speakers S1-S4 and word lengths from 1 to 4 syllables. If L2 were a boundary tone falling at the right edge of the focused element, it would have aligned to the target word offset, the vertical line, across all target word lengths.

With the alignments of the tonal targets L2, H2, and L3 as shown below in Figure 6, we found that compared to 1C placement, 1W placement showed a significantly earlier L2 target (the low target between the adjective and the noun) and H2 target (the noun peak) for all speakers, and a significantly later L3 target (the low target between the noun and the verb) for three speakers; see Figure 7.

Figure 8 displays one of the boxplots showing significant differences between tonal alignment for 1C and 1W in broad focus, as schematized in Figure 7. The boxplot compares L2 alignment to the onset of the noun in broad focus for 1C and 1W placements across all speakers S1-S4. It

shows that for all speakers, L2 was aligned significantly earlier for 1W than 1C placements.

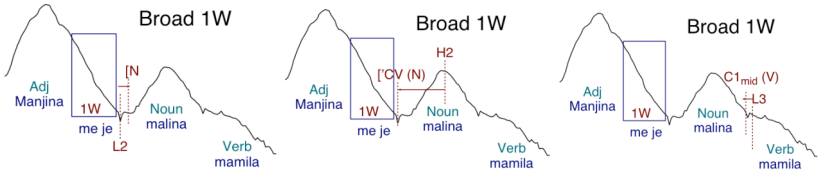

Figure 6. Alignment choices for L2, H2, and L3 for data analysis. These were used for both 1W and 1C placement (not shown). Left: L2 was aligned with respect to the onset of the noun. Center: H2 was aligned with respect to the onset of the noun. Right: L3 was aligned with respect to the midpoint of the initial consonant in the verb.

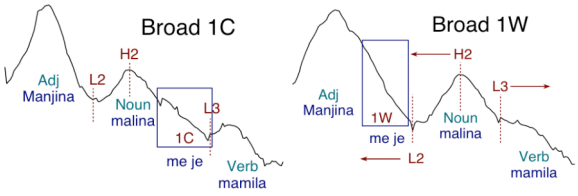

Figure 7. Schematic representation of differences in prosodic realization in broad focus between 1C (left) and 1W (right) clitic placements. All speakers had significantly earlier L2 and H2 targets in 1W placement compared to 1C, and three speakers had significantly later L3 targets in 1W placement.

4 Conclusions

In our production study on the interaction of alternation in second position clitic placement, prosody, and focus pragmatics in Zagreb Croatian, we found no interaction between clitic placement and prosody in narrow focus (against Hypothesis 2a in (7)). There was no evidence for a tradeoff in prosodic and syntactic marking of focus between 1C and 1W placement in narrow focus, with the idea that the 1W word split construction word order syntactically marked focus.

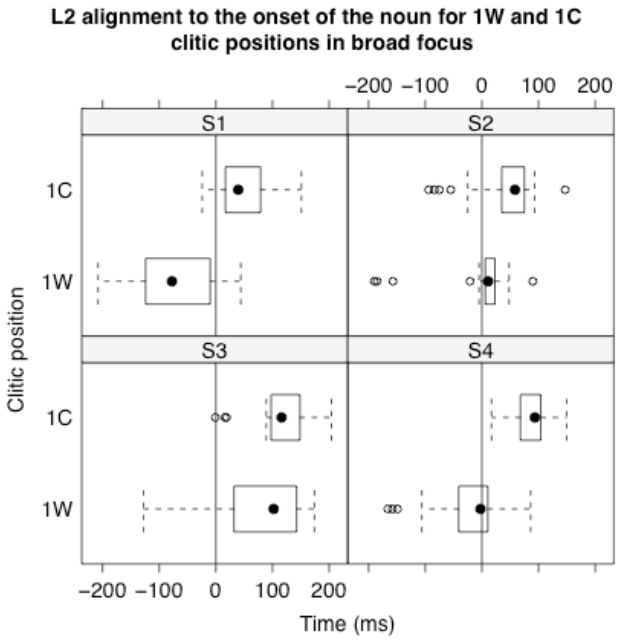

Figure 8. Alignment of L2 to the onset of the noun (indicated by the vertical line at x=0) in broad focus across clitic placements for all speakers S1-S4. L2 was significantly earlier for 1W placement for all speakers.

In addition, we found no evidence for L- aligned at the right edge of the focused element (against Hypothesis 3 in (9)), contrary to predictions based on Radanović-Kocić (1988, 1996), Godjevac (2000, 2005), and Smiljanić (2004). Because the L- is not aligned at the right edge of the focused element, prosody cannot provide evidence for a prosodic/syntactic break following the focused element, as suggested by evidence from degemination in Radanović-Kocić (1988, 1996) and the split construction syntactic analysis of 1W placement, under an edge-aligned direct syntax-prosody mapping.

Finally, we did find tonal alignment differences between 1C and 1W placement in broad focus, consistent with Hypothesis 2b in (7): there were differences in the prosodic realizations across clitic placements in broad focus. We need to do further work to fully understand what

underlies these differences, but one interpretation of the earlier low target L2 and noun pitch peak H2 is that they are retracted together because they are part of a bitonal pitch accent on the noun, prosodically marking focus on the noun. The use of 1W placement in focusing the noun has been reported by our consultants and in Bošković (2001). This could be focal marking on the head of the DP, indicating DP-focus, and would be consistent with the hypothesis that 1W placement is inherently associated with focus. However, the interaction of 1W placement with focus pragmatics is complicated by additional interactions of 1W placement usage with dialect, idiolect, and register; understanding 2P clitic placement alternation requires investigation of these sociolinguistic factors as well.[7]

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[7] For instance, further fieldwork in Zagreb after the completion of the work described here suggested that 1W placement can be felicitous or even preferred over 1C placement in broad focus for some Zagreb Croatian speakers, i.e. interaction of 1W placement with focus pragmatics is highly speaker-dependent.

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