

Phonology determined by syntax: Enclisis in Czech

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The study of clitics typically examines how clitic placement is influenced by the prosodic and/or syntactic size of the clitic's host ([R2], [R16]). This paper focuses on Czech, where pronominal clitics (PCLs) appear in the second position after the first syntactic constituent, regardless of its size ([R6], [R12]). Since PCLs are classified as enclitics, they are expected to integrate phonologically with their syntactic host. We test this phonological integration of PCLs experimentally, aiming to explore the extent to which enclisis is influenced by the syntactic nature of the clitic's host.

The relationship between enclisis and the syntactic status of the host is a relevant issue because the ordering of the host (i.e., the first constituent) and the PCL results from movement, involving different syntactic mechanisms for various constituents ([R5]). Verbal and non-verbal constituents differ, as evidenced by the fact that non-verbal pre-clitic constituents can be modified (1bb), unlike verbal ones (1aa).

(1)	a. [Kous] <u>ho</u> pes. bit PCL.3.SG.ACC dog	aa. *[Trochu kous] <u>ho</u> pes. a_bit bit PCL.3.SG.ACC dog
	b. [Pes] <u>ho</u> kous. dog PCL.3.SG.ACC bit	bb. [Zuřivý pes z útulku] <u>ho</u> kous. angry dog from shelter PCL.3.SG.ACC bit

This cross-linguistic observation leads some scholars to consider verbs as heads ([R5], [R10], [R15]) which according to [R7] form a single syntactic constituent with the PCL. By contrast, non-verbal nominal/adverbial (N/ADV) hosts are phrases, which are structurally separated from the PCL. If the syntactic constituency determines phonological processing ([R8], [R13]), we hypothesize that the PCL is processed in one phonological cycle with the verb-head host but in separate cycles with phrasal N/ADV hosts. Therefore, we predict a lower degree of phonological integration of PCLs in examples like (1b) compared to (1a).

To test this PCL integration hypothesis, we analyze three phonological phenomena observed in spoken Czech: (i) degemination, (ii) regressive obstruent voicing assimilation, and (iii) final obstruent devoicing. These processes are applied with respect to the phonological word (PW) in Czech ([R9]). While the first two processes (i-ii) occur within the PW, the third (final devoicing) indicates a PW boundary ([R3]). Since a PW boundary implies a cycle boundary ([R11]), we expect the first two processes to apply more productively to verb-head hosts, which form a single syntactic constituent with the PCL. In contrast, final devoicing should be more productive in N/ADV hosts that are syntactically separate from the PCL. These hypotheses were tested experimentally on three PCLs: /*ɦo*/ 'him.ACC', /*mu*/ 'him.DAT', /*mi*/ 'me.DAT'.

The experiment comprises recordings from 47 Czech native speakers, testing a total of 817 items (a sample is provided in (2)). EXP1 assessed the degree of degemination ([R4]); EXP2 examined the degree of voicing assimilation with the obstruent-initial PCL /*ɦo*/, and EXP3 investigated the degree of obstruent devoicing before all three PCLs ([R1]). The phonetic characteristics of the /**bolded**/ strings were analyzed using the Praat program.

(2)	host	EXP1: (de)gemination	EXP2: voicing assimilation	EXP3: final devoicing
	V	Přisti/ ɦ fi/o během podvodu.	Přine/s fi/o do kanceláře.	Pově/z m/i tu novinku.
	N/ADV	Vra/ ɦ fi/o zranil.	Pe/s fi/o pokousal.	Mrá/z m/u spálil bylinky.

The results confirm that PCLs are more integrated with verb-head hosts than with phrasal N/ADV hosts. Table 1 shows that deeper enclisis is manifested by a shorter average duration of the geminate cluster at the verb-head boundary, indicating degemination. Tables 2 and 3 reveal that higher enclisis with verb-head hosts is indicated by: (i) more productive obstruent assimilation with the PCL /fio/ at the end of the verb-head host; and (ii) more productive devoicing in phrasal N/ADV hosts. In sum, enclisis is more pronounced with verb-head hosts across all parameters (exceptions may be influenced by the choice of tested items: unequal vowel length before the tested cluster seems to affect the results).

In conclusion, our research provides experimental evidence for the interaction between syntax and phonology. We investigated three phonological processes that are sensitive to the syntactic constituency of enclitic structures. The varying productivity of these processes, depending on the syntactic nature of the enclitic host, demonstrates that the marking of prosodic boundaries is relative rather than absolute ([R14]).

what do we compare	ITEMS	MEAN	STAND. DEV.	ITEMS	MEAN	STAND. DEV.	<i>v</i>	<i>t</i>	<i>t</i> -test statistical table values (quantiles 1- $\alpha/2$)		statistically relevant difference
									$\alpha = 10\%$	$\alpha = 5\%$	
V vs Adv	<i>přine/s fio</i>	106	26	<i>dne/s fio</i>	148	34	87	6,485	1,662	1,986	strong
	<i>přive/z fio</i>	114	27	<i>sná/z fio</i>	129	28	86	3,840	1,662	1,986	strong
	<i>pi/x fio</i>	158	37	<i>navr/x fio*</i>	134	33	82	3,214	1,665	1,986	strong
	<i>přisti/f fio</i>	117	24	no mono/bi-syllabic adverb in Cz which ends with -h					---		
	<i>přine/s m/i</i>	144	19	<i>dne/s m/i</i>	173	25	52	4,718	1,676	2,008	strong
	<i>pově/z m/i</i>	144	16	<i>sná/z m/i</i>	157	24	54	2,333	1,673	2,004	strong
	<i>pi/x m/i</i>	163	13	no mono/bi-syllabic Adv in Cz which ends with -ch					---		
	<i>přisti/f m/i</i>	139	19	no mono/bi-syllabic Adv in Cz which ends with -h					---		
V vs N	<i>přine/s fio</i>	106	26	<i>pe/s fio</i>	123	29	87	2,907	1,662	1,986	strong
	<i>přive/z fio</i>	114	27	<i>mrá/z fio</i>	111	23	85	0,535	1,662	1,986	none
	<i>pi/x fio</i>	158	37	<i>pra/x fio</i>	139	41	82	2,188	1,665	1,986	strong
	<i>přisti/f fio</i>	117	24	<i>vra/f fio</i>	136	29	85	3,823	1,662	1,986	strong
	<i>přine/s m/i</i>	144	16	<i>pe/s m/i</i>	155	27	53	1,676	1,673	2,004	weak
	<i>pově/z m/i</i>	144	19	<i>mrá/z m/i</i>	143	22	51	0,313	1,676	2,008	none
	<i>pi/x m/i</i>	163	13	<i>pra/x m/i</i>	165	26	51	0,330	1,676	2,008	none
	<i>přisti/f m/i</i>	139	19	<i>vra/f m/i</i>	168	21	54	5,376	1,673	2,004	strong

**Navrch* is not an ideal Adv since it is derived by the fusion of PREP *na* and N *vrch*, it is thus questionable whether *navrch* is a real Adv or a PREP phrase, nevertheless, it is the only Adv in Czech which ends with -ch and matches the criterion of mono/bi-syllabicity. *Navrch* is then omitted from the experiment with clitics *mi* and *mu*.

what do we compare	ITEMS	MEAN proportion of devoicing in %	STAND. DEV.	ITEMS	MEAN proportion of devoicing in %	STAND. DEV.	<i>v</i>	<i>t</i>	<i>t</i> -test statistical table values (quantiles 1- $\alpha/2$)	statistically relevant difference
V vs Adv	<i>přine/s fio</i>	7,7	13	<i>dne/s fio</i>	17,3	20	171	3,764	1,980	strong
V vs N	<i>přine/s fio</i>	7,7	13	<i>pe/s fio</i>	13,4	18	171	2,410	1,980	strong

what do we compare	ITEMS	MEAN proportion of devoicing in %	STAND. DEV.	ITEMS	MEAN proportion of devoicing in %	STAND. DEV.	<i>v</i>	<i>t</i>	<i>t</i> -test statistical table values (quantiles 1- $\alpha/2$)	statistically relevant difference
V vs Adv	<i>přisti/f fio</i>	5,6	12	----- <i>sná/z fio</i>	14,0	18	126	2,789	1,980	strong
	<i>pově/z m/i</i>			<i>sná/z m/i</i>						
	<i>přisti/f m/i</i>	40,8	16,4	-----	47,8	12,8	85	2,158	1,986	strong
V vs N	<i>přive/z fio</i>	5,6	12	<i>mrá/z fio</i>	7,1	12	168	0,820	1,980	none
	<i>pově/z m/i</i>			<i>mrá/z m/i</i>						
	<i>přisti/f m/i</i>	40,8	16,4	<i>vra/f m/i</i>	47,3	13,5	111	2,267	1,980	strong

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