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Tobias Scheer

# VARIABLE SHAPE TEMPLATES AND THE POSITION OF CZECH IN TEMPLATIC TYPOLOGY

## ABSTRACT

*The article proposes an overview of the kind of templatic restrictions that are found across languages, as well as of related issues. Questions that are addressed include the delineation of templates (how is the stretch of the linear string defined that is subject to a templatic restriction?), their raison d'être (why do they exist in cases where they are not a morpheme?) and their interaction with morpho-syntax (how does the phonological size restriction come into being given the morpho-semantic category associated?). The study also looks at templates in acquisition, which appear ex nihilo when target languages have no templates (hence in absence of any stimulus) and disappear at a certain developmental stage. The existence of child templates may be related to the development of memory: templates are an instrument that reduces the amount of memory mobilized per word. Finally, it is shown that there are two distinct types of templates: Fixed Shape Templates (FST) and Variable Shape Templates (VST). The former are the classical Semitic templates where a fixed sequence of consonants and vowels satisfies the templatic restriction. While these can be stored as one lexical item, VST cannot since they satisfy the size restriction by way of a variety of shapes. For all issues discussed, the position of Czech templates in the typology is identified.*

## KEYWORDS

*Templates; Variable Shape; Fixed Shape; Acquisition; Interface; Memory.*

## 1. Generative linguistics in Brno

I think I first met Petr Karlík in the immense staircase of the Rectorat's building at Masaryk University in Brandlova street back in the early 2000s, where one of the *Čeština – univerzália a specifika* conferences was held that he co-organized. He

was wearing a Humphrey Bogart trench coat and was grumpy, but interested and somewhat incredulous to see somebody from France being into in Czech and able to speak. His concern, he told me in the evening over beer, was that the Czech Republic was more or less a blank spot on the generative map of Europe. There was the Sgall-Hajičová school in Prague, but that represented an older stage in the evolution of generative grammar. Petr wanted to colour Brno within the blank spot, but did not really know how to go about it. Being a syntactician, he had an idea of how Czech could contribute to the debate: Czech has a lot of overt morphology, much more than other languages that are around in the generative discussion (mainly Germanic and Romance), and this could offer an overt control, he conjectured, over phenomena whose manifestations can often only be indirectly observed. This is why he thought it would be a good idea to study the fine mechanics of Czech word formation, rather than the bigger pieces of regular syntax. Phonology was a strange animal in the picture he had of the landscape: interesting in itself like the exotic species you see in a zoo, but not anything you would want to have at home. In the Czech context, of course, phonology was enshrined by the Prague Circle, back in the 30s but also in its contemporary instalment. Petr reckoned that things were to be done beyond the phoneme, the system and the commemoration of the times when Prague was the centre of the phonological universe, but he would not know even where to start or what to look at.

Fifteen years later, being about to retire, I think Petr can lean back, looking at the present linguistic *fauna brunensia*. There is a syntactician, a morpho-phonologist and a semanticist covering the linguistic core, all young. And even phonology has found a way into networking with the smaller pieces of the concatenative world. This setup is the result of Petr's work, directly or indirectly, and in any case corresponds to the masterplan. Generative linguistics in the Czech Republic in general and in Brno in particular would not be the same had Petr not tenaciously pursued his idea of introducing Czech data into the discussion and of making Brno a place that counts, also beyond the national borders.

As far as I can tell, the one thing in Czech phonology that raised Petr's interest from time to time are templates (rather than vowel-zero alternations or, the eternal palatalizations). Every now and then he wrote mails to me asking about this or that aspect, or whether a strange alternation in a paradigm could have a templatic origin. This summer (2015) while working on the second edition of the New Encyclopedia of the Czech Language, he asked about the lengthening observed in short forms of adjectives (*starý* – *stár*, *mladý* – *mlád*) and why only the vowel *a* seems to play that game (*sytý* – *syt*, *bosý* – *bos*). He also wanted to know about the shortening in imperatives (*koupit* – *kup*, *chválit* – *chval*).

On the pages below, a survey of templatic activity across languages and patterns is proposed which establishes the distinction between Fixed Shape and Variable



Shape Templates. A specific focus is placed on the position of Czech with respect to the issues and parameters discussed.

## 2. Prosodic Morphology

The template is a grammatical notion known since the Arabic grammarians of the 9th century A.D. It was studied in the neogrammarian (e.g. BROCKELMANN 1908) and structuralist tradition (e.g. CANTINEAU 1947), and introduced into generative theory by McCARTHY's (1979) Ph.D. on Classical Arabic, which takes advantage of autosegmental representations. Originally restricted to languages with non-concatenative morphology such as Semitic, McCarthy's multi-tiered analysis grew into a more general theory, Prosodic Morphology. The idea of this approach is that the autosegmental segregation of melody and structure (structure being understood broadly: syllabic, prosodic, morphological) is also a valid tool outside of Semitic, i.e., in the analysis of languages where non-concatenative morphology is absent.

KAGER - ZONNEVELD (1999) and DOWNING (2006) provide an informed overview from a post-hoc perspective. A prototypical example appears under (1) below.

(1)		melodic tier: diathesis and aspect/verbal group    morpheme 1 templatic tier: form II „iterative / intensive“    morpheme 2 root tier    morpheme 3
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The linear object *kattab* ‘he made write’ decomposes into three distinct and non-continuous morphemes. This is where the name of the theory comes from: in Prosodic Morphology, a morpheme may be made of the material of just one autosegmental tier, and the items of this material do not need to be adjacent in the linear string. Templates are thus about the management of syntagmatic space: quantity distinctions count (long vs. short vowels, two vs. three consonants etc.), while quality distinctions are irrelevant (*a* vs. *i*, *t* vs. *m* etc.).

Prosodic Morphology has the ambition to export the templatic analysis to languages that lie outside of the Semitic family, and whose morphology is purely concatenative. It is argued that generalizations and insights are missed unless templates in the above sense (i.e. made of prosodic categories, understood broadly) are assumed. Prosodic Morphology has been successful in three major areas: 1) reduplication, 2) minimal word constraints and 3) language games. McCARTHY - PRINCE (1996), which is an annotated version of the original 1986 manuscript (McCARTHY - PRINCE 1986), provides a good overview of the empirical coverage (see also the historical overview provided by KAGER - ZONNEVELD 1999 as well as STERIADE 1988 and McCARTHY - PRINCE 1990). More recently, DOWNING (2006)

looks at the evolution of Prosodic Morphology, expanding the empirical material that is subject to relevant generalizations.

Finally, templatic activity does not appear to be predictable across languages: it is a parametric possibility that languages may or may not make use of. Even though it is a typical feature of Semitic, it is not true that all Semitic languages are clearly templatic. Nor is it true that only Semitic languages are templatic. There are no other typological features either that have been found to systematically cluster with templaticity.

In the same way, the size restrictions imposed on strings are variable within and across languages, and do not appear to correlate with any other property, or to be predictable. Semitic templates accommodate three, four or more consonantal slots, minimal word constraints may impose one or two syllables (moras), what is called Variable Shape Templates below may impose two, three, four or more moras. These templatic requirements may define a minimal, a maximal or an exact size.

### 3. Variable Shape vs Fixed Shape Templates

#### 3.1 Fixed shape

The literature on templates in non-Semitic languages features a recurrent pattern that is quite different from classical Semitic-style templates or other instances of templatic activity such as reduplication. Semitic-style templates may be called Fixed Shape Templates (FST), which are also often referred to as items with *constant shape* because the string under templatic control is made of an invariable sequence of consonantal and vocalic slots.

Semitic-style FST enforce the association of a given morpho-semantic category with a certain consonantal and/or vocalic volume which is calculated in terms of the number of vocalic/consonantal items. For example, a Classical Arabic root is made of at least three consonants. So-called sound verbs (or trilaterals) such as the aforementioned  $\sqrt{ktb}$  'to write' incarnate as *katab-a* 'he has written' (root-internal vowels carry morphological information). So-called weak verbs (or bilaterals), on the other hand, are one consonant short. This is then repaired by either the reduplication of the second consonant (so-called deaf verbs, e.g.,  $\sqrt{md}$  → *madad-* 'to extend'), or the insertion of a glide ( $\sqrt{rm}$  → *ramay-* 'to throw'). The relevant generalization has been formulated (after Arabic grammarians of the 9th century) by McCARTHY (1979) as the *Template Satisfaction Principle*. In our case, the template is CVCVC-, and in case the lexicon provides only two consonants for the three slots needed, an additional consonant is created.

Another feature of Semitic-style templates is that they are typically believed to be recorded in the lexicon as such. This is the case for example under (1): Form II in Classical Arabic always follows the pattern  $CVC_xC_xVC$ , i.e., where the medial



consonant geminates. The template thus has a fixed shape. There is a different way of implementing a templatic restriction, though: a size restriction is also imposed on a given string, which however can take a number of different shapes. That is, the templatic constraint is global. For example, a given morpho-syntactic category must weigh exactly 3 moras. This global weight constraint may then be satisfied by a number of different shapes: CVVCV is as good a 3-mora item as CVCVCV and CVCVV (where VV is a long vowel), or eventually CVC.CV (in a language where codas are moraic). This is what may be called Variable Shape Template (VST).

### 3.2 Variable shape

An instance of VST is discussed by HYMAN – INKELAS (1997). In Tiene (Bantu), the string formed by the root and a derivational affix (denoting stative, applicative etc., and which may be realized as a suffix or as an infix according to melodic properties) must weigh 2 moras. That is, there are only two ways for this so-called D(erivational)-Stem to surface: as either CVCVC (e.g. stative: *ból-a* ‘break’ – <sub>D-stem</sub>[ból-ek]-ε ‘be broken’) or CVVC (e.g. applicative: *koł-a* ‘nibble’ – <sub>D-stem</sub>[kooł]-ε ‘nibble for’). Note that this exhausts the logical possibilities to satisfy a two-mora constraint (when consonants do not count, which is the case in Tiene). Hyman and Inkelas insist on the fact that there is no size restriction on any other combination of morphemes: the root alone for example may be C, CV, CVC, CVVC or CVCVC.

A similar case is found in Japanese, where POSER (1990, 81ff) reports that hypocoristics must weigh exactly three moras. Codas count in this language, and the specific hypocoristic suffix is *-tyan*. While 2-mora roots remain unmodified (*emi* → *emi-tyan*), roots that exceed two moras are shortened: CVCVCV inputs lose their last CV (*akira* → *aki-tyan*), CVVCV... names lose everything but CVV (*syuusuke* → *syuu-tyan*), and CVCV<sub>x</sub>V<sub>x</sub> inputs come out as CVCV<sub>x</sub>-*tyan* (e.g. *taroo* → *taro-tyan*). The same is true when coda consonants are involved: *gen* → *gen-tyan*, *kinsuke* → *kin-tyan*. Finally, inputs that are too short are lengthened: *ti* → *tii-tyan*. A well-formed hypocoristic thus instantiates either CVCV-*tyan*, CVV-*tyan* or CVC-*tyan*.

This again exhausts all logical possibilities, which are augmented by moraic codas when compared to Tiene. But as in Tiene, the size of items that do not belong to the specific morpho-syntactic category at hand remains unmarshalled. Also, an interesting observation is that only the root undergoes modification in order to meet the templatic restriction: *-tyan* is absolutely invariable. Note that this is not a trivial property of the template, which controls the overall weight of a string that encompasses the root *and* the suffix. This is at least the default interpretation: a three-moraic constraint is imposed on the segmental material that is dominated by the mother of the root and *-tyan*. In this perspective, a morphologically defined sub-string is designated for eventual modifications that are necessary in order to meet the templatic restriction (i.e. the root in our case). Alternatively, however, the

invariability of the suffix allows for an interpretation whereby the templatic restriction is *triggered* by the presence of *-tyan*, but concerns only the root node itself. In this case, there is no need for an extra specification of the sub-string of the template that will be subject to templatic modification.

A parallel situation is found in Ibibio (Niger-Congo) where AKINLABI – URUA (2002) report a templatic restriction on strings that encompasses the root and negative/reversive suffixes (underived stems are free: CV, CVC and CVVC items occur). While the suffix is constantly *-CV* (and its melodic content copied from the root), the root is modified with respect to its lexical shape in such a way that it ends up bimoraic. In this language, coda consonants count, and the bimoraic request on the root may thus be satisfied by either CVCV, CVC or CVV. CVCV roots concatenate with *-ké* and are fine (e.g. *sárá* ‘comb’ – [*sárá-ké*] ‘not combing’ where [...] indicates the portion of the string under templatic control), CVC roots produce CVC-CV forms (e.g. *dát* ‘take, pick up’ – *í*-[*dát-tá*] ‘s/he is not taking’) and CV roots derive CVV-CV (e.g. *sé* ‘look’ – *ń*-[*séé-γé*]). CVVC roots either lose the stem-final consonant (with the negative suffix: *kóót* ‘read/call’ – [*kóó-ró*]) or shorten the root vowel (with the reversive suffix: *fáák* ‘wedge between two objects’ – [*fák-ká*] ‘remove wedges’). The generalization is thus that the overall weight of the suffixed item is exactly three moras, with the additional specification that the heavy syllable is always left (CVCV-CV, CVV-CV or CVC-CV, but not \*CV-CVV). Following Prosodic Morphology, AKINLABI – URUA (2002) translate this observation into a fixed prosodic shape whereby a heavy-light trochaic foot is imposed on melodic items.

While the imposition of a fixed shape in form of a prosodic constituent can capture the pattern, it is not the only way to go about the puzzle, which has exactly the same properties as the hypocoristic formation in Japanese. That is, the suffix is strictly invariable, and only the root undergoes template-related modifications. The same alternatives are available as before: either the templatic restriction concerns the entire string [root-suffix] and there is a specific proviso that only the root is the theatre of templatic activity, or templaticity is imposed only on the root (but triggered by the presence of the suffix). In both cases, as before, the generalization holds that the variation of the root exhausts all logical possibilities: CVCV, CVV and CVC in Ibibio (since codas count and the suffix is C-initial).

### 3.3 What FST cannot do

In this context, the case of Czech iteratives (SCHEER 2003, 2004a,b) is interesting inasmuch as it does not allow an interpretation where the templaticity-triggering suffix remains outside of the template. In Czech, verbs with iterative meaning are derived from non-iteratives by suffixation. For example, *sad-i-t* ‘to plant’ produces the iterative *sáz-e-t* ‘to plant repeatedly’. Both items show regular Indo-European morphology: a root followed by a thematic vowel, followed by the infinitive morpheme *-t*. We observe iterative lengthening: the vowel of the iterative is long,

while its derivational origin is short. In other cases, however, iterative shortening is encountered: *cít-i-t* ‘to feel’ – *-cít-ova-t* ‘to feel repeatedly’.<sup>1</sup> What does this depend upon? The critical observation is that iterative lengthening occurs when the thematic element weighs one single mora (*-e-* in our case), while shortening is observed with bi-moraic thematic elements (*-ova-* in our case). In other words, all iterative derivations conspire to produce a constant weight of exactly 3 moras: short inputs lengthen when lexical ingredients produce only 2 moras, long inputs shorten when lexical ingredients supply 4 moras.

Unlike in Japanese and Ibibio, though, the templatic regularity cannot be calculated without taking into account the weight of the suffix, which precisely is variable and triggers the templatic modification of the root:  $[CVVC_{\sqrt{}}-V_{th}] - C_{inf}$  and  $[CVC_{\sqrt{}}-VCV_{th}] - C_{inf}$  only weigh three moras when both the vowels of the root and the thematic suffix are counted. And again, all logical possibilities to satisfy the template exist: beyond the two configurations quoted, there are also patterns where the lexical ingredients produce 3 moras and no templatic readjustment is needed. *máv-nou-t* ‘to wave’ produces *máv-a-t* ‘to wave repeatedly’ ( $[CVVC_{\sqrt{}}-V_{th}] - C_{inf}$ ), and *tlač-i-t* ‘to push’ derives *-tlač-ova-t* ‘to push repeatedly’ ( $[CVC_{\sqrt{}}-VCV_{th}] - C_{inf}$ ).

Finally, as before the triggering suffix is never modified in order to meet the templatic restriction: only the root undergoes templatic processing. That this is not always the case is shown by Somali (Cushitic). In this language, *-imo* is a noun-forming suffix. No matter what the size of the root, the string made of [root-imo] must weigh exactly 5 moras (coda consonants are moraic). A bi-moraic base such as *tol-* ‘to sow’ comes out as *toll-iimo* ‘seam’ where two things have happened in order to meet the 5-mora restriction: the root-final consonant is geminated, and the suffix-initial vowel is lengthened. A tri-moraic base such as *burs* ‘to take more’ only provokes the lengthening of the suffix-initial vowel: the result is *burs-ii-mo* ‘surplus’. Finally, a base that weighs already 5 moras together with the suffix experiences no modification: *doogs* ‘be sprinkled’ produces *doogs-imo* ‘sprinkling’.

In Somali, templatic processing may thus affect both the root and the triggering suffix. And as in Czech, the suffix necessarily counts into the template: only its variable weight (which this time depends on the weight of the root) allows us to calculate the 5-mora generalization.

### 3.4 VST: properties and predictions

The preceding discussion of VST prompts the following generalizations.

<sup>1</sup> The form is preceded by a dash to indicate that it is a bound root which occurs only with prefixes. These have no bearing on the phenomenon at hand.

- (2) Variable Shape Templates: generalizations
- a. The templatic restriction is triggered by a morpho-semantic category which spells out as an affix.
  - b. VST either scope over the string [root + affix] (Czech, Somali) or over the root alone (Japanese, Ibibio).
  - c. In VST, all logically possible combinations that allow for the satisfaction of the template exist.
  - d. Templatic processing may affect the root or both the root and the affix, but the affix only if it counts into the template.

If these generalizations are correct, the following typological predictions ensue.

- (3) Variable Shape Templates: predictions
- a. There are no VST without affixes being involved: VST are always triggered by an affix. By contrast, FST are never triggered by an affix (suffix, prefix).
  - b. There are no VST which involve just affixes.
  - c. There are no VST where the affix is modified, but the root is not.
  - d. There are no VST where an affix alone is under templatic command (i.e. in absence of the root). FST, on the other hand, may involve a prefix/suffix alone (e.g. in reduplication).

## 4. What is the purpose of templates?

### 4.1 VST are non-morphemic and hence have no function

An immediate consequence of the involvement of an affix in VST is that the rigid McCarthyian exponence is inapplicable: VST cannot be characterized in terms of an invariable – and hence storable – sequence of Cs and Vs. Rather, the exponence of VST is a constraint that imposes a certain weight to a morpho-syntactically defined portion of the string. That is, the exponence involves computation, rather than a lexical object. An intriguing question is therefore how a Vocabulary Item, i.e. the phonological exponence of morpho-syntactic categories, could be a process, rather than an object.

Another consequence of the fact that VST involve affixes concerns the morphemic status of the template. While a Semitic-style template typically is a morpheme (e.g.,  $C_1aC_2C_2aC_3$  = ‘causative perfective active’), the kind of templatic object that occurs in Czech never enjoys a morphemic status. Indeed, there is always an independent affix that unambiguously identifies the morphological and semantic identity of the object at hand. Therefore, a good question is about the function of templates



in Czech: why should a language impose restrictions on certain morphologically and/ or semantically defined categories if this operation does not provide any specific information? Or in other words: why are there templates in Czech at all?

#### 4.2 *Templates in acquisition*

Templates in L1 acquisition describe a general, systematically observed behaviour in production that is used to build and learn a new word. In this perspective, templatic activity is a strategy for the expression of segmental content that is missing due to its yet incomplete memorization. Truncation, reduplication, consonant harmony etc., then, reflect the approximation of the target items; their volume and internal organization are progressively stabilized as the phonotactic restrictions of the target language are assimilated. Following this scenario, the template provides babies with a crutch that helps them to be linguistically active in a period when the necessary grammatical and lexical knowledge is still missing.

The first templatic analysis of data from language acquisition is due to MACKEN (1992). It was carried out in an autosegmental framework and with reference to the more general issue of the 'whole-word hypothesis' (MENN 1978, VIHMAN 2001). In Vihman's approach (VIHMAN - CROFT 2007, VIHMAN 2015), templates are mainly constrained by perception, input frequency and articulatory continuity. That is, they are completely acquired (i.e. learned) and vary from one child to another. Vihman also operates with language-specific variation, showing that templates are at least partly constrained by properties of the target language. The examination of about a dozen languages has evidenced a number of global constraints concerning weight, segmental inventory and melodic patterning for consonants and vowels (VIHMAN - KEREN-PORTNOY 2013). In sum, child templates appear to be by and large lexical objects with pre-specified items - that is, FST (rather than VST) in the above sense.

WAUQUIER (2005) and WAUQUIER - YAMAGUCHI (2013) argue that the different templatic patterns observed in French are surface manifestations of the same abstract structure. This structure results from generalizations that children make over French rhythm and syllable structure and is delineated by a demarcative accent and counter-accent. Its initial and final syllables are strong positions which children establish very early on. They are almost never truncated, and their segmental material is typically preserved. There is a variable number of intermediate syllables, which for French children in early production below two years does not exceed two. Unlike the first and the last syllable, these internal syllables are weak and unstable.

### 4.3 Absent in the input and useless in the target language: why do children develop templates?

Templates have been identified in first language acquisition of non-Semitic target languages that lack templatic structure. This relates to the continuity debate: are children developing incomplete and murky versions of adult grammars, or is their grammar independent of the adult target and at some point replaced by the adult structure? The observation is that children produce systematic templatic patterns that have no source in the input, and which disappear when the child stabilizes his/her grammar and approaches adult proficiency.

This fact appears to rule out a strictly input-constrained and frequency-based conception of acquisition that assumes a developmental scenario where children only mimic the surface forms of adults. It also militates in favour of discontinuity. The question, then, is parallel to the one concerning adult VST: why do children bother developing a formal structure and taking action in order to make their output conform to it when this structure is absent from the signal and has no purpose in the target language, i.e. needs to be abandoned in later stages of the development?

Limited memory resources and lexical growth may be a promising track. Vihman has observed that templates emerge at a developmental stage when children start having words: it appears only once the child has a repertoire of 10 to 20 lexical items. That is, the emergence of templates seems to be concomitant with the point in the development where children are starting to systematise their linguistic knowledge. At that point, children have already put effort in acquiring phonetic knowledge both in perception and production. However, phonological, i.e. contrastive knowledge can only be based on meaning, and meaning supposes the existence of discrete units that are stored in the lexicon (morphemes or words).

The absence of templates at the 10-20 word stage shows that they are not a prerequisite for the lexicalization of units. What they seem to be necessary for is the multiplication of stored items: children at this developmental stage can memorize a few words, but lexicalizing too many items may exceed their memory capacity. That is, templates could be a response to the lack of memory resources.

This ties in with the observation that templates are not just prosodic structure: they also involve segmental specifications (fixed consonants or consonants selected among a natural class, harmony). These fixed segmental properties alongside with the stable size of templates are an instrument to reduce the amount of memory mobilized per word: less segmental material needs to be stored, and targets that are too long are squeezed into the size imposed by the template. As a result, templates allow children to store more items given constant (and limited) memory resources. In this perspective, templates fade away simply when memory resources have (independently) grown big enough to do all the storage necessary for lexical development.



Finally, another interesting observation made by Vihman is that emerging templatic activity in child production goes hand in hand with a regression of accuracy (of the reproduction of the adult target). This looks like a typical instance of biological systems that accept a momentary drop of efficiency that will allow them to have an efficiency leap forward after some time (e.g. human infants have a very long period of dependency on adults as compared with other species, which in evolutionary terms is a regression given the conditions of the wild). What children want to “buy” with the templatic instrument, then, seems to be time: they want to build a lexicon whose size exceeds their current memory resources and therefore compress information. Or, in other words, having a low quality lexicon is better than having no lexicon: the quality will be augmented as memory resources develop.

## 5. Delineation of templates

Another issue regarding the formal properties of templates is their delineation: how are the two margins defined? This question is related to the association of templates with a specific morpho-semantic category: are there templates which are not associated to any such category? The classical (Semitic) understanding is that templates always represent some morpho-semantically defined chunk of the string.

This, however, does not seem to be the case in Germanic, where the length of the root vowel is often found to correlate with the following (root-internal) consonants, but not with preceding consonants: schematically, either a root ends in -VVC or in -VCC, while items that are too light (-VC) or too heavy (-VVCC) do not occur. Relevant literature includes RUBACH (1996, concerned with the English and the German situation), WIESE (1996, 33ff, German pattern), HULST (1985, Dutch evidence), RIAD (1992, Nordic).

CARATINI (2009) has examined the diachronic and synchronic situation in German. A typical interpretation of the pattern recognizes the existence of a bi-moraic (or bi-positional) constraint on the rhyme, which is calculated in presence of a vowel-initial suffix: [...VCC]<sub>√</sub>-V (e.g. *halt-en* [halt-ən] ‘to hold’) and [...VVC]<sub>√</sub>-V (e.g. *biet-en* [biit-ən] ‘to bid’) identify as ...VC.CV and ...VV.CV in syllabic terms, respectively. The rhyme thus weighs exactly two moras (VC or VV). This analysis (argued for e.g. by WIESE (1988, 67) and HALL (1992, 50)) faces a number of problems, though: 1) in word-final position, the last consonant needs to be discounted (by extrasyllabicity or some other means), 2) before C-initial suffixes (e.g. *Krank-heit* ‘illness’) some extra technology needs to account for the super-heavy rhyme ...VCC-C....

In any case, the templatic restriction appears to control a syllabic (the last rhyme of the root), rather than a morphological domain (the root): the portion of the string that is under templatic control runs from the stressed vowel to the end of the root (BENDJABALLAH –HAIDEN 2003). Any additional material occurring to the left of the last root vowel is irrelevant: there may be zero (*Alt-er* ‘age’), one (*schalt-en*

‘to switch’), two (*brand-en* ‘to surge’) or three (*strand-en* ‘to beach’) root-initial consonants, and any number of preceding vowels (*telefonier-en* [...iir-] ‘to telephone’, *Diamant* ‘diamond’, *Protestant* ‘protestant’ etc.) may occur. In sum, the situation in German(ic) is unclear: no doubt there is a VST, but the delineation of the templatic domain begs the question since it does not correspond to any morphological division. Any linear definition of the templatic domain will have to appeal to a morphological unit, though: the templatic span is the last rhyme of the root, or anything from the end of the root leftwards until its last vowel.

An alternative that appears to be empirically correct is to realize that the vowel involved in the templatic restriction is always the tonic vowel of the word. The relevant domain then identifies either as “anything to the right of the tonic vowel within the root” (still making reference to the root) or “the rhyme of the tonic vowel” (with no reference to morphological units). In fact the pattern “anything from the end of the root until the tonic vowel” is a recurrent pattern, discussed for example by CARVALHO (2004, 2006): in Portuguese, the metaphonic modification of the root vowel is triggered by a thematic vowel that cannot appear on the surface because it does not fit into the template. On Carvalho’s analysis, the template is delineated by the tonic vowel and the end of the word.

## 6. Interface: information flow between morpho-syntax and phonology during templatic activity

An understudied aspect of templates is their relation with extra-phonological categories. Templatic exponence of morpho-syntactic categories is studied specifically by BENDJABALLAH – HAIDEN (2005, 2008, 2013), BENDJABALLAH – REINTGES (2009) and, regarding Czech infinitives and the involvement of prefixes and negation, by ČAHA – SCHEER (2008).

Templates are always associated to some morpho-syntactic (or morpho-semantic) category (which includes extra-grammatical notions such as hypocoristics, ludlings etc.). That is, the template is either part of the exponence, or the only exponence (as in the typical Semitic pattern) of categories such as aspect, tense, number etc. The study of templatic languages thus far has not brought to light any systematic or necessary bond between a given morpho-semantic category and its being templatic: there is no apparent reason why Czech iterative verbs and infinitives are templatic but, say, *l*-participles are not.

How exactly is templatic exponence managed? In the classical case of FST, the template has a storable number of consonantal and vocalic slots (e.g.  $CVC_x C_x VC$  for Form II in Classical Arabic) and may therefore be treated as a regular Vocabulary Item that is stored in the lexicon and inserted in place of a number of morpho-syntactic terminals. It was mentioned in Section 3.3 that this take on templatic exponence as a simple storage of Vocabulary Items is not available for (certain kinds of) VST.



Managing Semitic-style FST by this simple storage is McCARTHY'S (1979) original perspective, whereby as many templates are lexically stored as there are bin-yanim. GUERSSEL - LOWENSTAMM'S (1990) take where Classical Arabic has only one single template that hosts a derivational [CV] unit, however, cannot be handled in the same way: the identity of Form II for example is the association of  $C_2$  to the derivational [CV] unit, and Form III gives the "order" to  $V_2$  to spread onto the [CV]. Hence exponence is not straightforward: it does not (only) involve the insertion of an object into the phonological string, but also affords a process (association) that targets a specific melodic item ( $C_2$  or  $V_2$ ).

The idea that association lines in an autosegmental representation may also play an active role, i.e. be the carriers of morpho-syntactic information, is an interesting innovation in autosegmental theory. It is promoted for example in turbidity theory (REVITHIADOU 2007, VAN OOSTENDORP 2006), and is also explored in the analysis of French liaison (ENCREVÉ - SCHEER 2005: association is not automatic), vowel-zero alternations in Slavic (SCHEER - ZIKOVÁ 2010, SCHEER 2010), Kabyle Berber (BEN SI SAÏD et al. 2009) and Somali (BARILLOT 2002).

## 7. The situation in Czech

### 7.1 Templatic activity in Czech

Templatic structure in Czech is studied by BETHIN (2003), SCHEER (2001a, 2003, 2004a,b), CAHA - SCHEER (2008), ZIKOVÁ (2012, 2013, this volume), and CAHA - ZIKOVÁ (2015). Czech is rife with templatic categories: cases in point examined in these works are iteratives, diminutives, verbal prefixes, infinitives, hypocoristics, comparatives (of adjectives and adverbs), V-final prefixes, items of the feminine *a*-declension (*žena* 'woman') and the agentive suffix *-ař/-ář*. Further candidates mentioned in SCHEER (2001b) are short forms of primary adjectives (*star-ý - stár* 'old'), denominal adjectives in *-í* (*pták - ptač-í* 'bird'), collective nouns in *-í* (*dub - doub-í* 'oak'), relational adjectives in *-ový* (*líp-a - lípo-vý* 'linden'), imperatives (*váz-a-t - važ* 'bind') as well as agentives in *-č* (*sáz-e-t - saz-e-č* 'plant') and *-tel* (*táz-a-t - taz-a-tel* 'ask').

### 7.2 Diachronic situation and synchronic activity

Diachronically speaking, SCHEER (2003, 2011) has shown that templatic vowel length in Western Slavic in general and in Czech (ŠAUR 1995) in particular is independent from what is traditionally assumed to be the source of modern length, i.e. Common Slavic and OCS length and intonation, Eastern Slavic stress, metatony and the like. Rather, relevant vowel length is home-grown, i.e. a genuine Western Slavic innovation.

The templatic patterns that are found in Czech are often irregular, i.e. have more or less exceptions. This is of course indicative of the fact that the templatic mecha-

nism which once created them is no longer active in synchronic computation. Note that this does not make this mechanism less real – it just places its workings in some former stage of the language.

The feminine *a*-declension for example is restricted by a template that comprises the root and the case marker: this stretch cannot weigh more than 3 moras. Hence C(C)VC roots with a long vowel will shorten in case a two mora suffix is attached, that is Isg *-ou*, Dpl *-ám*, Lpl *-ách* and Ipl *-ami*. This produces alternations such as *blán-a* ‘membrane’, *blán-γ*, *blán-ě* vs. *blán-ou*, *blán-ám*, *blán-ách*, *blán-ami*. Words following this pattern include *čár-a* ‘line’, *kráv-a* ‘cow’, *dír-a* ‘hole’, *hlín-a* ‘clay’, some of which have developed or develop unshortened forms: *hlin-ou/hlín-ou*, *hlin-ám/hlín-ám*. In case short and long forms coexist, the former is always archaic: *dír-a* – *dě-ou/dír-ou* ‘hole’, *vír-a* – *věrou/vír-ou* ‘faith’, *vláh-a* – *vlah-ou/vláhou* ‘moisture’. Many words (among which very frequent items) do not alternate at all, i.e. have no shortened forms at all, e.g. *kár-a*, – *kár-ou* ‘cart’, *váz-a* – *váz-ou* ‘vase’, *kříd-a* – *kříd-ou* ‘chalk’, *mích-a* – *mích-ou* ‘spinal cord’, *chův-a* – *chův-ou* ‘nanny’, *touh-a* – *touh-ou* ‘desire’. In sum, the pattern is not productive and its members slowly erode by all possible means.

Another measure of the unproductivity of a templatic pattern is when the meaning (rather than the form) has gone its own way in developing from the original state. Iteratives must weigh exactly three moras, i.e. [root+suffix]<sub>3μ</sub>. As was mentioned earlier, the three conjugations that iteratives are made in, *-a(-t)*, *-e(-t)* and *-ova(-t)*, create opposite weight conditions: short roots will have to lengthen when concatenated to *-at* and *-et*, while long roots must shorten when followed by *-ovat*. Hence *sad-i-t* – *sáz-e-t* ‘plant’, *skoč-i-t* – *skák-a-t* ‘jump’ (lengthening) and *cít-i-t* – *ciť-ova-t* ‘feel’ (shortening). Now there are items like *hled-ě-t* – *hlíd-a-t* which follow precisely this pattern, but whose semantic relationship is not anything that could be called iterative. Or rather: not anymore. It is obvious that ‘look often/repeatedly’ will be able to be interpreted as ‘to watch so that nothing bad (such as robbery) happens.’

What that means is simply that the pair *hledět* – *hlídat* did come into being through an iterative derivation which produced regular semantics and phonology. That is, *hlídat* at that stage meant ‘to look often/repeatedly’. Then *hlídat* was lexicalized, i.e. was not the output of a derivation based on *hledět* anymore. At that stage, it could develop idiosyncratic meaning since it did not receive any iterative semantics through any derivational link with *hledět* anymore. Whether this diachronic scenario can or should be made into synchronic workings whereby the semantic idiosyncrasy is in-built into the derivation (by sister-adjointing the affix that produces unpredictable semantics directly to the root) is another question. This is the typical move undertaken in Distributed Morphology.

More items whose phonology still betrays the templatic iterative derivation but which have lost the relevant semantics include *kalit* – *kálet* ‘melt (iron) – defecate’, *kazit* – *pře-kážet* ‘spoil – be in the way’, *patřit* (arch.: *patřit tváři tvář smrti* ‘to be looking at the death face to face’) – *pátrat* ‘to look for’.



An interesting question to be asked in this context is whether any of the templatic categories that have been identified in Czech are the result of synchronic computation at all. Intuitively, it is hard to conceive that all iteratives (or diminutives, comparatives, infinitives etc.) are absent from the lexicon of present-day natives, and come into being only through a derivation that concatenates the root with affixes and imposes the templatic restriction. A relevant observation in this context is that all or almost all items that show templatic workings (of all templatic categories) in Czech belong to the native vocabulary that was present in the language since Common Slavic.

The question whether templatic restrictions are the result of synchronic computation in modern Czech is pursued in greater detail by SCHEER (2003, 115) for iteratives. Although these show very regular templatic patterns that concern a large number of roots, there are still 23 counter-examples such as *stavít* – *stavět* ‘build’, *seknout* – *sekat* ‘cut’ (lengthening expected) and *vrátit* – *vracet* ‘go/give back’, *šlápnout* – *šlapat* ‘step’ (no shortening expected). If iteratives today are regular vocabulary items whose root is stored in long term memory with iterative meaning and the relevant vowel length, the absence of templatic iterative formation from the grammar should show when new iteratives enter the language: they are expected to show no variation in length even in case they weigh two or four moras. It is hard to come by relevant examples for independent reasons: the only productive verb class seems to be *-ova-* (*telefonovat* ‘to phone’, *faxovat* ‘to fax’, etc.), to the effect that new verbs do not belong to relevant source classes that should provoke lengthening of (C)CVC(C)-roots. However, thematic *-a-* seems to be marginally productive: *kliknout* ‘to click (computer)’ has an iterative *klikat*. Were the templatic restriction still active, the two-mora item *klikat* should experience lengthening.

Of course nothing much can be concluded from this one example. The conclusion is that this area is understudied and the empirical record of new lexical items that instantiate templatic categories deserves more attention.

### 7.3 Parameter settings in Czech

Given the distinctions made in the preceding sections, the (parametric) settings for Czech are shown under (4) below.

- (4) templatic workings: parametric settings for Czech
  - a. only Variable Shape Templates
  - b. The templatic domain always includes an affix.
  - c. Only the stem is modified in order to meet the templatic restriction, affixes remain constant.
  - d. Only vowel length is modified under templatic pressure: no vowels are ever deleted or inserted in order to meet a templatic restriction.
  - e. Only vowels count (?).

(4a) and (4b) are intertwined: VST appear to always involve affixes, see (3a). As a consequence, templates in Czech serve no purpose (see Section 4.1): they are superfluous because (unlike in FST) the morpho-semantic category always has an affixal exponence. The fact that only vowels count (4c) for the calculus of templatic restrictions may simply indicate that codas (and anyway onsets) are not moraic in Czech (in the sense of Weight-by-Position, HAYES 1989). In fact, BETHIN (2003) does report a case where codas contribute weight in templatic hypocoristic formation. Consider the data under (5) that illustrate hypocoristics built on four different suffixes, which are attached to a CVC- base that is left after truncation of the input name.

(5) Hypocoristics in Czech (BETHIN 2003)

a. -a	b. -ouš	c. -da	d. -ča (fem.)
Jiří – Jíra	Antonín – Tonouš	Jiří – Jirda	Anna – Anča
Vladimír – Vlída	Bohuslav – Bohouš	Stanislav – Standa	Hána – Hanča
Petr – Péťa	Jaroslav – Jarouš	Vilém – Vilda	Olga – Olča
Božena – Bóža	Helena – Helouš	Zdena – Zdenda	Fána – Fanča
Daniela – Dáňa	Marie – Marouš	Nána – Nanda	Antonína – Tonča

The concatenation of the one-mora item *-a* under (5a) produces lengthening of the root vowel, while no such lengthening occurs when the bi-moraic suffix *-ouš* is attached as under (5b). The generalization is that hypocoristics weigh 3 moras. The consonant-initial suffixes *-da* under (5c) and *-ča* under (5d) behave like the bi-moraic suffix *-ouš*, though: they do not trigger lengthening – on the contrary they enforce shortening, should the root vowel be long in the input (*Nána* – *Nan-da*, *Hána* – *Hanča*). This means that the output already weighs three moras after suffixation and therefore does not need to lengthen: *Jirda*, *Olča* etc. weigh three moras. What they distinguish from *-a* and *-ouš* formations is that their suffix is consonant-initial and hence makes a coda out of the CVC- stem it attaches to. This coda then must contribute the mora that is missing when just counting the vowels. BETHIN (2003, 64) points out that “[w]hat is particularly intriguing in this case is that the presence of a syllable coda may contribute to syllable weight, something which is otherwise not characteristic of Czech phonology where there is no evidence for or against weight-by-position or heavy syllables.” She interprets the fact that coda weight only seems to occur in a marginally grammatical derivation such as hypocoristic formation as the emergence of the unmarked in a specific sector of the language where the regular parameter settings may be overridden.

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