# Branching onsets 2.0*

or maybe rather

# I don't believe in magic!

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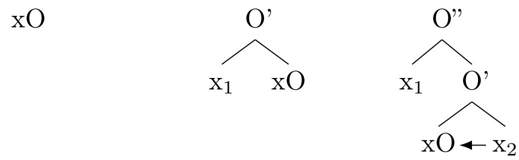
Building on Pöchtrager (2006), Kaye and Pöchtrager (2009), The Gang of Four (2009), Živanović and Pöchtrager (2010), and Kaye and Pöchtrager (2013), this talk proposes a representation of branching onsets in GP 2.

## 1 The ingredients

In Pöchtrager (2006: §2.3), the "manner of articulation" is encoded by the number of layers of an OP (1). As he needs $x_2$ in stops to be inert for m-command, he introduces a *control* relation and assumes that in a two-layered structure, control between the lower complement and xO is obligatory.[1,2,3]

(1) a. 0-layered (approximants) b. 1-layered (fricatives) c. 2-layered (stops) (GP 2.0)




Control finds further utility in Živanović and Pöchtrager (2010) and Kaye and Pöchtrager (2013), who take the space-providing property of **A**, discussed in Pöchtrager (2006: 4.2.2), to its logical conclusion. Element **A** is abandoned, its function taken over by adjunction structure, i.e. a "split" head.[4] (Note that both the upper and the lower node of a split head count as a head node.) It is then assumed that the two nodes joined by adjunction (the lower xN/xO and its sister, x) can be related by control, as in (2c) and (3a).

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[1]In Pöchtrager (2006), all projections of xO are head-final. As a word-final obstruent trades in length with the preceding nucleus (this phenomenon being the main topic of Pöchtrager's dissertation), it seems reasonable to assume that $x_1$ in obstruents precedes O('). However, to the best of my knowledge, nothing in the dissertation hinges on the linearization of the first complement in two-layered structures (see also Pöchtrager 2006: 101). We will see that the linearization within NPs, $[_{N''}$ x $[_{N'}$ xN x]], proposed in Živanović and Pöchtrager (2010), turns out to be a better starting point when we want to represent branching onsets. To keep the confusion to a minimum, I therefore draw two-layered OP structures using this linearization even when citing authors using other linearizations.

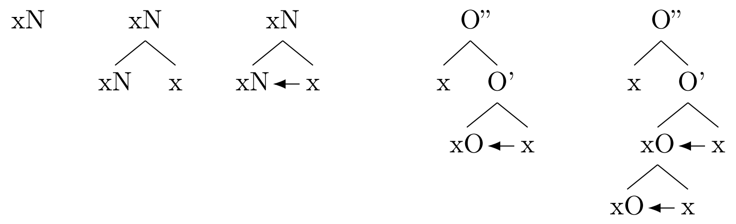
A careful reader will also have noticed that there is a method to my linearization madness. All controlling skeletal points (and the nodes between the controller and the head) are linearized to the right of the head; the rest of the nodes are linearized to the left. The only exception to this rule are adjunctions, which I always draw as head-initial. Further research will reveal if the intuition behind this has any merit.

[2]The direction of control in Pöchtrager (2006) is from the head (xO) to the unannotated skeletal point (x). The present proposal will reverse this direction (cf. the reversal of m-command's direction in Živanović and Pöchtrager 2010). As far as I can see, the reversal has no empirical consequences for Pöchtrager's original theory. To keep the confusion to a minimum, I draw control relations using the reversed direction even when citing authors using the original direction.

[3]Pöchtrager (2006) encodes the fortis–lenis distinction by means of m-command: in fortis consonants, $x_1$ of representations in (1) m-commands xO; in lenis consonants, it m-commands xN of the containing NP. As fortis–lenis distinction is irrelevant for this talk, I omit these m-command relations for reasons of clarity. For the same reason, the representations will not include **L** of (Slovene) voiced obstruents, which I assume annotates $x_1$.

[4]The original definition of adjunction (Pöchtrager 2006: 165–167) allows both adjunction to a head $[_{xH}$ xH{**A**} x] and to a skeletal point $[_{x}$ x{**A**} x]. Both head-adjunction and x-adjunction must be licensed by **A**-annotation of the split node and in all instances in Pöchtrager (2006), this **A** can be interpreted as a place definer. As we will reject place definers in non-head positions in §2.1, we have no use of x-adjunction and thus assume it does not exist.

(2) a. [ɨ] b. [ə] c. [a] (3) a. [k] b. [t]




As this extension of the domain of application of control was not yet formalized, we do so now.[5]

(A1) Control is a binary relation between two nodes, a controller (the source) and a controllee (the target).

(A2) A controller must be an unannotated skeletal point.

(A3) A controllee must be a head.

(A4) The source and the target of control must be sisters. (to be revised)

(A5) If an unannotated skeletal point is the complement of (the upper) xO in a two-layered structure, it must control.[6]

(A6) A daughter of the maximal onset projection must not control. (to be removed)

Unannotated skeletal points need special attention: they need to be licensed, and control is but one of the licensing mechanisms (Pöchtrager 2006: §2.3.2.3).[7]

(A7) Every unannotated skeletal point must be licensed by exactly one licenser.

(A8) The licensing mechanisms are the following:[8,9]

a. A controlling skeletal point is licensed. (The controllee is the licenser.)

b. An m-commanding skeletal point is licensed. (The m-commandee is the licenser.)

Finally, I adopt Živanović and Pöchtrager’s (2010) notions of c++command, island and m-command.[10]

(D1) xH (both upper and lower in the case of a split head) and its projections (H’, H” etc.) form a *projection line.*

(D2) Constituent $\gamma$ *immediately contains* node $\alpha$ iff it contains $\alpha$ and $\alpha$ is a sister of some node in the projection line containing $\gamma$.[11]

(D3) Node $\alpha$ *c-commands* node $\beta$ iff

a. $\beta$ is $\alpha$’s sister, or

b. $\alpha$’s sister dominates $\beta$.

(D4) Node $\alpha$ *c++commands* node $\beta$ iff

a. $\alpha$ c-commands $\beta$, or

b. $\alpha$ is the highest terminal in the maximal projection immediately containing $\alpha$ and $\alpha$’s mother c-commands $\beta$; see (4).

[5]The original restrictions on control were “an unannotated x in a non-maximal onset projection must be controlled by its xO” and “control is unique to the non-maximal onset projection” (Pöchtrager 2006: 77). (Note that these restrictions are not equivalent, despite Pöchtrager’s claim to the contrary. The former requires control in the relevant configuration, the latter prohibits it elsewhere.)

[6]I have reformulated Pöchtrager’s (2006: 77) original condition to keep its intended meaning intact in the **A**-less system.

[7]Živanović and Pöchtrager (2010) don’t employ the notion of licensing, its function essentially taken over by Binding Theory. Clearly, the two approaches must be eventually unified. See also footnotes 10 and 13.

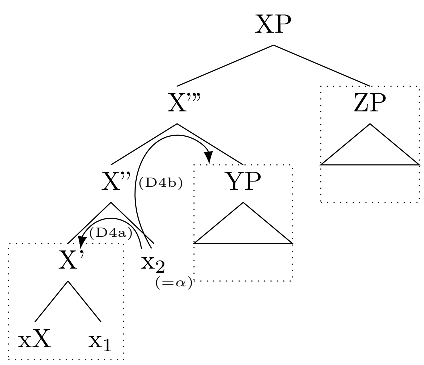
[8]The list of licensing mechanisms (A8) omits p-licensing (Pöchtrager 2006: §3.2.2, §3.3.2 and §3.3.3), as it is not relevant for our discussion.

[9]We could also assume that all (not just unannotated) skeletal points must be licensed and include annotation in the list of licensing mechanisms. This would entail that a skeletal point can be only annotated with one element, which seems to be a forming consensus.

[10]The *No m-command into islands* universal, proposed by Živanović and Pöchtrager (2010), creates a problem for licensing of $x_1$ in stops (1c). The original intention (Pöchtrager 2006: §2.3) was that $x_1$ is licensed by m-command, either of the containing NP’s xN (yielding a lenis stop) or of the xO (yielding a fortis stop). *No m-command into islands* makes the latter relation impossible, as $x_2$ controls xO, making O’ an island. However, the situation might not be as grave as it seems at first sight. Živanović and Pöchtrager (2010) deal exclusively with annotated m-commanders (their PTH 3 prohibits unannotated m-commanders in Putonghua), so it is not unimaginable that the two analyses actually talk about two different relations.

[11]Definition (D2) fixes a mistake in Živanović and Pöchtrager’s (2010) second clause of c++command definition, which applied to heads in one-layered structures, something that was never intended.

(4)




(D5) Let $R$ be a binary relation between nodes of a tree structure. A constituent is an *R-island* iff it is the smallest constituent containing the source of some instance of $R$ and its c++commanding domain.[12]

(A9) M-command is a binary relation between two nodes, an m-commander (the source) and an m-commandee (the target).

(A10) An m-commander must be an unannotated[13] skeletal point.

(A11) An m-commandee must be a head.

(A12) The m-commander must c++command the m-commandee.

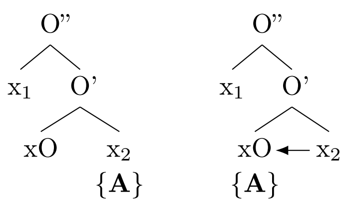
(A13) An m-commander can m-command only once.[14]

## 2 Internal Affairs

### 2.1 Mind your manners!

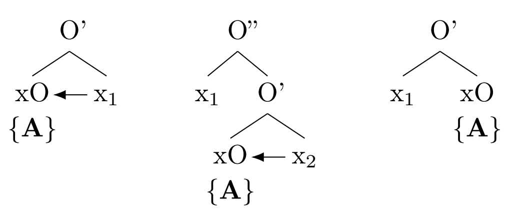
Pöchtrager (2006: 2.3.3) argues that [l] is a stop and thus proposes to represent it by a two-layered structure (5a). To differentiate it from [t] (5b), he furthermore proposes that in [l], **A** annotates $x_2$ (which therefore does not control xO).

(5) a. [l] b. [t] (GP 2.0)




The obvious undesired aspect of (5a) is the "wrong" position of **A**. For most[15] other consonants, the place of articulation is determined by the annotation on the head (xO) — not unlike in GP 1, where most authors assumed that the place-defining element (if present) is the head of the melodic expression. I therefore propose to avoid the clash between [t] and [l] in some other way. Indeed, this can be easily achieved by assuming that [l] equals [t] minus the topmost layer ($x_1$ and O''). The result, still within the system with **A**, is shown in (6), which includes the representation of [θ] (Kaye and Pöchtrager 2013: 60) to show that our new representation of [l] differs from the latter as well.

(6) a. [l] b. [t] c. [θ] (GP 2.0 backport of the new proposal)




[12]Unlike the original definition, (D5) is generic in the sense that it can be applied to any given binary relation on a tree. However, it only makes sense if the relation is based on c++command, i.e. if the source is required to c++command the targer. Control (both the original version and the redefinition in this talk) and m-command (but only the reversed version from Živanović and Pöchtrager (2010)) are c++command based. Other relations used in Pöchtrager (2006), e.g. A-command (Pöchtrager 2006: 6.2.1) and p-licensing (Pöchtrager 2006: 3.3.3), are not.

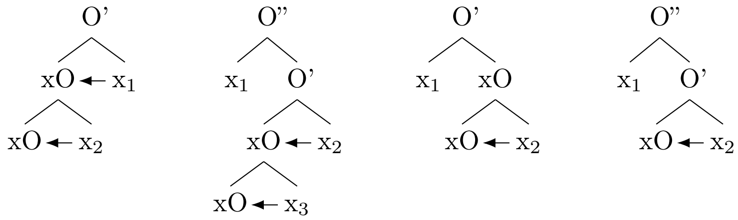
[13]Živanović and Pöchtrager (2010) relax Pöchtrager's (2006) original requirement and allow annotated skeletal points to m-command. In this talk, I'm reverting to the original idea that the source of m-command must be unannotated. See also footnote 7.

[14]This requirement is not strictly necessary, as it already follows from (A7), (A8b) and (A10). We only need it if we adopt the system presented in §8.2.

[15]The only two consonants where Pöchtrager (2006) uses a place definer to annotate a non-head are [l] and [s]. In both cases, the complement of xO is annotated by **A**.

In (6a), the topmost (and only) x controls, violating (A6). Furthermore, according to (1), (6a) should be a fricative, as it is a one-layered structure. The new representation of [l] must obviously be accompanied by a change in both the formal requirements on control and the encoding of manner of articulation. This is again fairly easy to achieve. With respect to interpretation, observe that of the structures in (6), all and only the stops have a controlled xO and all and only the obstruents[16] have a skeletal point not contained in a control island. With respect to the formal requirements, note that the only function of (A6) was to prevent control in one-layered structures, as $x_1 \rightarrow xO$ in (6b) is also prohibited by (A4), which requires that control-related nodes must be sisters. Requirement (A6), we can therefore simply drop. Before writing down these ideas formally, let us translate the structures in (6) into the **A**-less system (7), adding the representation of [k].

(7) a. [l] b. [t] c. [θ] d. [k]




A glance at (7c) tells us that we need to be careful when stating the encoding of stopness. In (7c), xO is controlled, but [θ] is not a stop. It appears that in case of a split xO, only control of the upper xO induces a stop interpretation. In other words, we need to identify a non-split xO with the upper xO of a split head; the lower xO is "the extra guy."

(A14) An OP is interpreted as a stop iff its non-split or outer xO is controlled.

(D6) A node is a *mainland* node iff it is not contained in a control island.

(A15) An OP is an obstruent iff it immediately contains a mainland skeletal point.

(A6') (dropped)

(A15) works not only for multi-layered structures it was motivated by, but also for zero-layered structures. These don't contain any skeletal points at all, so the obstruency condition in (A15) obviously cannot be satisfied.

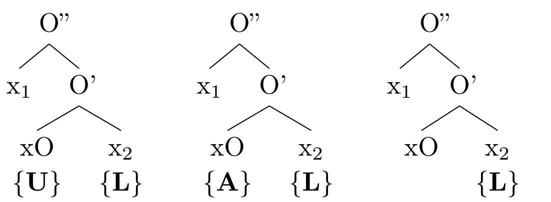
(8) [j]

xO
{**I**}

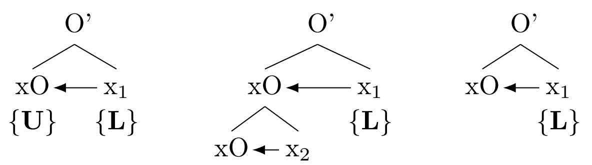
## 2.2 Reaching further

Turning to nasals, we hit a problem adapting Pöchtrager's (2006: 87) structures (9) to our new encoding of stopness. (The transition to the **A**-less system, however, is painless, as **A** in [n] annotates the head.) We have two options. Applying the same modification as for [l], i.e. removing the outermost layer and introducing control in the new outermost layer, we get (10), where $x_1$ controls although it is annotated (by **L**), violating (A2). The second option is to allow $x_1$ to control xO (11), resulting in structures violating the sisterhood condition on control (A4).

(9) a. [m] b. [n] c. [ŋ] (GP 2.0)

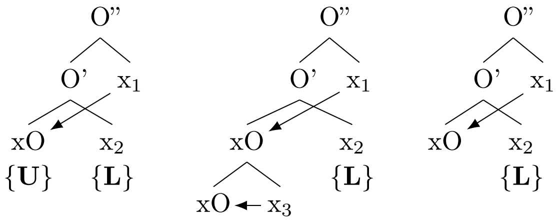



(10) a. [m] b. [n] c. [ŋ] (rejected)




[16]A formal definition of obstruents and/or sonorants cannot be found in Pöchtrager (2006) or other GP 2 literature cited here. This is not surprising, as the layer-based "manner" system does not yield a simple criterion of obstruency. Zero-layered structures (approximants) are sonorants and one-layered structures (fricatives) are obstruents, but the status of two-layered structures is not uniform. They are obstruents iff their lower x complement is unannotated.

(11) a. [m] b. [n] c. [ŋ]




Both structures in (10) and (11) contain all the ingredients needed to create a nasal stop. Control of (the upper) xO is interpreted as stopness. The entire OP is a control island, which makes them sonorants. Both types contain **L** enclosed in a control island, which we can interpret as nasality (opposed to **L** not enclosed in a control island (see footnote 3), which can be interpreted as active voicing).

Given the lack of an immediately apparent advantage of one option over the other, my decision to adopt the second option (11) is based more on intuition and theoretical elegance than hard data. While selecting the first option (10), which would necessitate relaxing (A2) by allowing annotated skeletal points to control, would make control unlike m-command and also "divorce" it from licensing, we will see below that adopting the second option (11) actually makes the theory both more internally consistent and syntax-like.

Observe that it is natural to express the state of affairs in (11) in terms of c++command ($x_1$ c-commands and thus c++commands xO) and locality ($x_2$, being annotated, cannot control, so the second closest skeletal point, $x_1$, gets the chance to do so), and this is precisely what we do in (A2')–(A4') below.[17] (In (A16b) we ensure, somewhat ad hoc, "locality" at the target's end.)

(D7) Assume that skeletal points $x_1$ and $x_2$ both c++command head xH. $x_1$ is *closer* to xH than $x_2$ iff $x_2$ c++commands $x_1$. (Note that any set of skeletal points $\{x_1, \ldots, x_n\}$ c++commanding xH always contains a unique closest skeletal point.)

(A2') Any unannotated terminal which c++commands node $\alpha$ is a *potential controller* of $\alpha$.

(A4') a. A node may only be controlled by its closest potential controller.
b. If a node is a potential controller of both parts of a split head, it may only control the upper head.

Given (A2')–(A4'), the increased theory-internal coherency can be seen in the fact that both m-command and control are now based on c++command, and in the observation that island-based restrictions (used by Živanović and Pöchtrager 2010 and in this talk) are, like the above-defined notion of closeness, essentially a form of locality conditions. Closing of the gap to modern generative syntax can be felt by reminding ourselves that the concept of sisterhood is long gone from generative syntax,[18] the basic present-day structural relation being c-command, and that locality (expressed e.g. as Rizzi's (1990) Relativized Minimality) is one of the most important concepts of minimalist syntax.

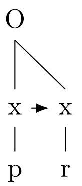
## 3 Let's branch!

### 3.1 Stop! Control!

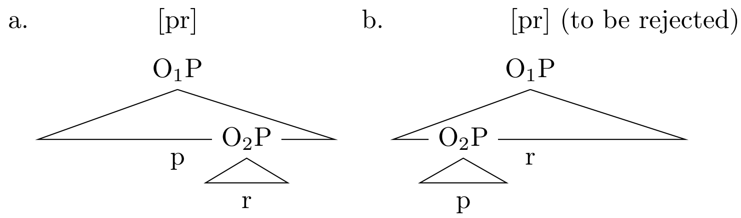
The notion of a segment as a skeletal point with the associated melodic material gone as a result of the proliferation of skeletal points, the representation of a branching onset ($O_1O_2$) along the lines of (12) becomes untenable. However, we now have the option of (direct) OP recursion: embedding an OP within another OP (13). We will call an OP containing another OP a *complex onset.*[19] Throughout the rest of the paper, I refer to the complex (also outer) onset as $O_1$P and to the embedded (also inner) onset as $O_2$P.

In principle, we have two options here. Given branching onset *pr*, either [r] could be embedded within *p* (13a) or vice versa (13b). We go for the former option as it intuitively corresponds better to the GP 1 structure, where the first member is the head of the constituent.

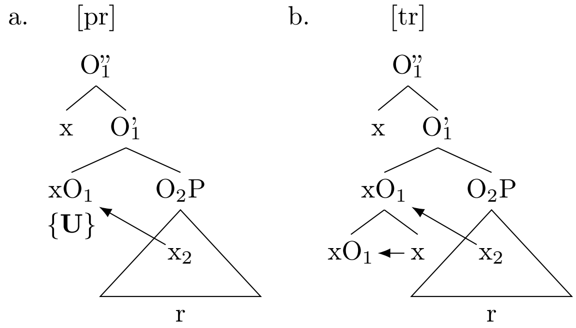
(12) [pr] (GP 1)




[17]Note that (A2) and (A3) are not really revised, as the conditions they impose end up valid with (A2')–(A4').
[18]Conditions on government of Government and Binding Theory employed sisterhood (Haegeman 1994: 86, 134).
[19]Embedding an OP within another OP has actually been already proposed, by Neugebauer (2016), who also calls the resulting structures complex onsets.

(13) 


We base our proposal on the obvious observation that the ideal first member of a branching onset is an (oral) stop. Given our proposal (§2.1) that stopness is the interpretation of a controlled (outer) xO, this follows immediately if we assume that in a branching onset $O_1O_2$, the stopness-inducing control of the outer $xO_1$ originates within $O_2P$ (14).

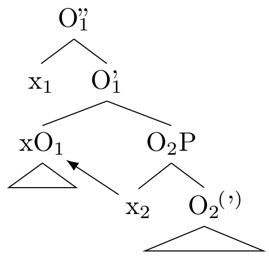
(14) 


We can formalize this idea in (A16) by employing the notion of transgression (cf. Pöchtrager 2006: 149).

(D8) A relation between nodes $\alpha$ (the source) and $\beta$ (the target) *transgresses* iff the path (moving only via the parent–child links in the tree) from $\alpha$ to $\beta$ crosses a maximal projection (XP). We will then say that XP is transgressed by the relation.[20]

(A16) Branching onsets correspond to complex onsets $O_1P$ in which $xO_1$ is the target of a control relation transgressing the embedded $O_2P$.

The x→xO control relation in (14) can be established because we have relaxed the locality condition for control from sisterhood to c++command (§2.2). Given (D4b), the source of control, $x_2$ in (15), must be immediately dominated by $O_2P$ for the relation to reach $xO_1$.[21]

(15) 


The control relation $x \rightarrow xO_1$ in (14) creates a control island $O_1$’. The entire $O_2P$ is therefore contained within a control island and must therefore, by (A15), be a sonorant. This prediction is obviously borne out. (By the same logic, we see that structure (13b) is incompatible with assumption (A16), as the first consonant of such a cluster would be a sonorant.) Unfortunately, however, I must admit that the story of $O_2$ is the weak point of the proposal. The theory overgenerates, either by allowing unbounded OP recursion, or by predicting nasals as possible $O_2$s. We will explore the two options in §8.

Finally note that we have not extended or modified our theoretical apparatus in this section in any way. All our theoretical assumptions were motivated exclusively on basis of simplex onsets. In particular, (A16) *requires nothing*. It simply asks us to take a look at a particular kind of structures and predicts that their interpretations will match all and only consonant clusters we (at least in GP) call branching onsets.

### 3.2 But I'm not a stop!

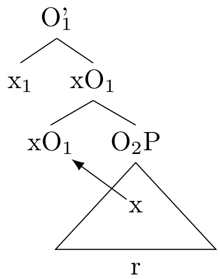
Importantly, we do not predict that only stops are possible $O_1$s. Any consonant represented by a structure with a controlled xO can function as $O_1$ in our proposal. Stops, having a controlled (outer) xO by definition,

[20] Pöchtrager (2006: 151) distinguishes upward and downward transgression: in the former, we "arrive at XP from below;" in the latter, "from above." In this presentation, we will only see examples of upwards transgression.

[21] In §8.2, we discuss a possible complication in the case of a zero-layered $O_2P$.

obviously fulfill the requirement, but structures in which only the lower xO is controlled should fit the bill as well. We seem to be right, as [θ] (7c) can definitely function as $O_1$ (16).

(16) [θr]

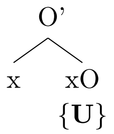



Obviously, structure (16) introduces a novel situation: its adjunction structure contains a maximal projection, $O_2P$. Until now, we have been adjoining only skeletal points. I believe, however, that being forced to allow adjoining maximal projections is a good result, as it brings adjunctions another step closer to being nothing but a regular projections, the first step being the decision (see footnote 4) to abolish x-adjunction.

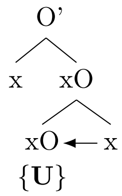
### 3.3 Go see a dentist, f!

[f], represented as (17)[22] in Pöchtrager (2006: 66), seems to present a problem. Structure (17) contains no control relation, so we predict, contrary to the fact, that [f] should not occur as the outer OP of a complex onset. However, unlike [p] and [m], [f] is not a *bi*labial: it is a labiodental. If we break the long and happy GP tradition of ignoring such details, we can propose a representation (18) which actually allows [f] to function as the outer OP, in precisely the same way as [θ] does (16).

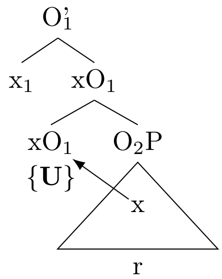
(17) [f] (GP 2.0)




(18) [f]

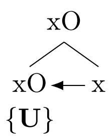



(19) [fr]

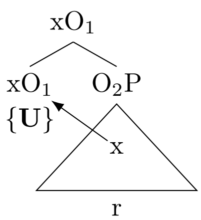



To represent Slovene [ʋ], which is an approximant, not a fricative,[23] we simply remove the top layer of [f]. The resulting structure is correctly predicted to be a sonorant (as it has no x outside control island) and to occur as $O_1$ (as it contains control).

(23) a. [ʋ]




b. [ʋr]




[22]Structure (17) is the representation of the lenis [f], not fortis [fː]. I have no insight into why only the latter can actually cannot occur as the outer OP in English.

[23]To see that Slovene v is not an obstruent observe that it does not (undergo or) trigger voicing assimilation (21), or devoice word-finally (22).

(20) a. vlak [ʋlak] 'train' (Slovene)

b. vrata [ʋrata] 'door'

(21) a. dvakrat veliko pivo [ˈdʋakrat ʋeˈliko ˈpiʋo] 'twice large beer'

b. dvakrat belo kavo [ˈdʋakrad ˈbelo ˈkavo] 'twice white coffee'

(22) pav [paw] 'peacock'

## 4 The *wrold of bilabial fricatives

In §3.3, we have proposed a new structure for [f]: its labiodentality was encoded by a split controlled xO. However, the simplex structure proposed for [f] by Pöchtrager (2006: 66) is not illicit: it (24) should represent a bilabial (non-branching, **U**-annotated xO) fricative (no control, contains an x) [ɸ]. As the head in this structure is not controlled, we predict that [ɸ] cannot occur as the first member of a branching onset.[24] To test this prediction, we have to look at languages with both [ɸ] and/or [β] and branching onsets. I managed to find three: Kaingang, Itelmen and Ewe.

(24) [ɸ]

O'

x xO

{**U**}

### 4.1 Kaingang

Based on Jolkesky (2009: 676–681), (25) paints a rough picture of the Kaingang consonant system.[25,26,27] Details aside, the list of possible branching onsets (26) (Jolkesky 2009: 682) is not particularily surprising.[28] Crucially, [ɸɾ] is not attested (27).[29] The Kaingang–Portuguese dictionary (Wiesemann 2011) confirms the situation.[30]

(25) a. [k], [p], [t], [c], [ʔ] (Kaingang)

b. [g]∼[ŋ], [b]∼[m], [d]∼[n], [ɟ]∼[ɲ]

c. [ɸ], [ç], [s], [h]

d. [w], [j], [ɾ]

(26) [kɾ], [pɾ], [gɾ], [bɾ]

(27) *[ɸɾ]

### 4.2 Itelmen

The problem with investigating Itelmen is that its orthography does not distinguish between bilabials and labiodentals (Kuhl 2017): both [ɸ] and [f] are written as ф, and both [β] and [v] are written as в (Cyrillic script). Furthermore, (phonologically relevant) sources are scarce and the language is almost extinct. All the data is taken from Володин and Халоймова (1989).

Given the orthography problem, we'll have to make an educated guess. The thing to notice is that all (really, *all*) word-initial clusters that look like proper branching onsets occur in Russian loanwords. Thus, when faced with (28), the only potential counterexamples to our claim in a 4000 word dictionary, we can be confident that they are pronounced with a labiodental.[31]

(28) a. Itelmen власт, Russian власть 'rule, authority'

b. Itelmen флаг, Russian флаг 'flag'

[24] Note that we don't predict that in every language with both [f] and branching onsets, [f] will occur as the first member of the latter, the point being that the absence of [f]-headed branching onsets in a language can be due to some other reason. In fact, this must be what happens in the "labiodental" dialect(s) of Kaingang (see footnote 30), where the reason for the absence of [fɾ] complex onsets is most likely that [f], not [ɸ], is the innovation, an assumption which gains further plausibility due to the fact that the Kaingang dialects have split fairly recently (Henry 1948: 194).

[25] Kaingang is a Gê language spoken by about 30.000 people in southern Brasil. It has five major dialects (Wiesemann 2011: 8). Jolkesky (2009) describes the speech of Cacique Doble Indigenous Area, near the Alto Uruguay river basin, in Rio Grande do Sul, belonging to the Southeast dialect.

[26] In Kaingang, every segment has a (pre- and/or post-) nasalized counterpart. In fact, the voiced stops, shown as alternating with nasals in (25b), are always pre- or post-nasalized, depending on the context. In short, Kaingang phonology is all about nasalization.

[27] Kaingang r has several realizations: tap [ɹ], (nasalized) approximant [ɾ]/[ɾ̃], and [l] (Jolkesky 2009: 681). I use [ɹ] in (25) as r occurs as a tap in branching onsets.

[28] Note the absence of [tɹ], analogous to the absence of [tl] in English; see also footnote 27.

[29] Given the absence of a voiced series of fricatives in general, the decision (Jolkesky 2009; Wiesemann 2011) to treat [w] as an approximant (Henry (1948) even takes it to be a vowel) and not voiced fricative seems to be appropriate. More precisely, Jolkesky (2009: 681) assumes that [w] and [β] are in free variation in onset positions.

[30] According to Wiesemann (2011), Kaingang has no [ɸ], but rather [f]. I attribute this to dialectal differences and assume there is a close (enough) historic correspondence between dialects with [ɸ] and [f] for the dictionary data to be relevant for our test. The dictionary, compiled in an effort to facilitate literacy and provide language resources, is also an attempt to harmonize the dialects (Wiesemann 2011: 8). It seems that the standardization gave a certain priority to the Paraná dialect, spoken between the Paranapanema and Iguaçú river; the distance between this area and Cacique Doble (see footnote 25) is about 300 km.

[31] There's a number of uncommon (word-initial) clusters in Itelmen. As we will see in §9, we should not be surprised that the absolute winner in the first member competition is [k], heavily beating even [s].

### 4.3 Ewe

At first look, Ewe seems to falsify our prediction. All its word-initial consonant clusters (Table 1) are of form Cr and Cl, and they include [ɸl] and [βl].[32] However, a closer inspection at Ewe phonotactics reveals a number of mysteries, listed below. Certainly, a definite verdict will require much further research.

| Cr? C Cl? bilabial | Cr? C Cl? labiodental | Cr? C Cl? alveolar | Cr? C Cl? retroflex | Cr? C Cl? palatal | Cr? C Cl? velar | Cr? C Cl? labial-velar | Cr? C Cl? uvular |
|---|---|---|---|---|---|---|---|
| ? p ✓ | | ✓ t | | | ? k ✓ | k͡p ✓ | |
| ? b ✓ | | d | ɖ | | ɡ ✓ | ɡ͡b ✓ | |
| m ✓ | | n | | ✓ ɲ | ŋ | | |
| | | ✓ t͡s | | | | | |
| | | ✓ d͡z | | | | | |
| ɸ ✓ | f ? | ✓ s | | | x ✓ | | |
| β ✓ | v | ✓ z | | | ɣ | | ʁ[33] |
| w | | r | | ✓ j | | | |
| | | l | | | | | |

Table 1: Consonantal system of Ewe, with word-initial Cr and Cl clusters

The pronunciation of Ewe *r* is a mystery to me. Most authors don't mention it at all. Warburton, Kpotufe, and Glover (1968) claim it is a voiced alveolar fricative [z]. According to Wikipedia, it is a tap. Westermann (1907: 21–23) claims that all instances of *r* in Ewe have developed from a voiced retroflex stop [ɖ]; more specifically, the source was a [ɖ]-initial suffix.

Ewe word-initial consonant clusters include the highly suspicious [sr] and [zr]. We know they cannot be branching onsets (Kaye 1992), but it is also dubious that they are an instance of a "magic" cluster. If that was the case, we'd expect other sC clusters as well, but we get none. Furthermore, English loanword adaptation shows that other (word-initial) sC clusters are indeed ungrammatical in Ewe (29).

(29) a. school → [suku] (Wornyo 2016: 46)

b. store → [sitɔ]

c. skirt → [siketi]

d. smoke → [sumoki]

Both Table 1 and the data in (29) argue against word-initial consonant clusters being bogus clusters.

If word-initial clusters $C_1C_2$ were branching onsets, we'd expect to find their reverses $C_2C_1$ word-medially, as coda–onset clusters (cf. Cyran 2010; Kaye and Lowenstamm 1981). This is not the case. Word-medially, we find almost[34] the same CC clusters as word-initially, plus (30).

(30) [ŋɡ͡b], [ŋk], [ŋl], ([nt])

[r] occurs only as the second member of a consonant cluster. In fact, various authors seem to agree that [r] is just an allophone of *l* after coronals and palatals (Warburton, Kpotufe, and Glover 1968: vi; Schadeberg 1985: 9). However, to claim this, one must disregard the words in (31).

(31) a. [príkú] 'mongoose' (synonymous to [axlɔ̃́ɛ̃́])

b. [brã́ɖá] 'Tuesday'

c. [ɑbrã́] 'name for a female born on Tuesday'

d. Krachi 'name of a town in Ghana'

e. [kra̍nté] 'machete' (synonymous to [yí])

All authors who care to characterize the possible word-initial consonant clusters limit them to Cl and Cr. However, we can also find some glides in the second position of a CC.[35]

(32) a. [t͡sjɔ́ akó a̍ɲî] 'to line on the stomach'

b. [t͡sjɔ̃̀e̍] 'to be pointed'

[32] The main source of data for my compilation of the list of Ewe consonant clusters was the vocabulary section of Dzablu-Kumah and Claudi (2006). The lists were confirmed and several gaps filled by combing through Westermann (1907) and Warburton, Kpotufe, and Glover (1968).

[33] Ewe [ʁ] is also described as pharyngeal [ʕ] (Warburton, Kpotufe, and Glover 1968: x).

[34] I haven't found [βl], [ɸl], [ɣl], [pl], [kr], [pr], [ɲr], [t͡sr] word-medially; but I found [dr].

[35] Interestingly, the first consonant in (32) is either a velar or an affricate; see §9.

c. [kwasiɖa] ([kɔsiɖa]) ‘week’
d. [kwȧ́síɖá] ([kɔ̇́síɖá]) ‘Sunday’
e. [kwȧmi] ‘name for a male born on Saturday’

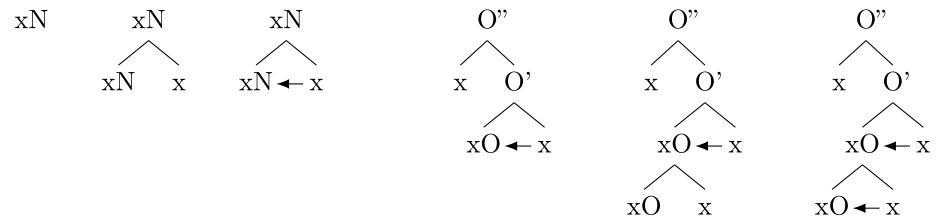
A potentially relevant fact: reduplication, when applied to a consonant cluster, always reduplicates only the first member (33).

(33) stative verb → attributive adjective
a. [ɠblɛ̃́] → [ɠbéɠblɛ̃́] ‘spoiled, bad, wrong’
b. [trì] → [tìtrì] ‘thick’

## 5 I don’t believe in magic (act 1)

Comparing (34) and (35), we see that we overgenerate the number of places of articulation for stops. While the hierarchical representations of GP 2 have a fantastic consequence of allowing more than one (melodically) empty place of articulation, resolving the long-standing issue of whether velars or coronals are empty (see e.g. Cyran 2010: fn. 12), structure (35b) seems superfluous.

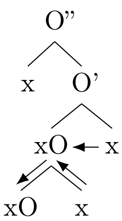
(34) a. [ɨ] b. [ə] c. [a] (35) a. [k] b. ? c. [t]



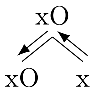

As the only other stop that could conceivably be considered empty in the current system is [ʔ], one possibility might be to assume that (35b) actually corresponds to velars and that (35a) should be used for glottals, paralleling [ɨ]–[ə]–[a] with [ʔ]–[k]–[t], but I don’t believe this is the way to go: the glottals are just too weird to have a “regular” place of articulation.[36]

Taking a look at the licensing requirements (A7)–(A8), it becomes obvious what is wrong with (35b): the lowest x is not licensed.[37] However, we are also reminded that we actually predict the existence of yet another empty place-defining structure, (36). So the above-described problem stays and I assume that structure (36) is illicit, universally. However, rather than assuming that m-command within adjunction structure (37) itself is illicit, I hypothesize that m-command-within-control is the problem here and propose to prohibit (36) by (A17).

(36) ?




(37)




(A17) A structure containing an m-command island within a control island is illicit.

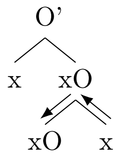
Crucial empirical support for the above assumption is that the set of possible places of articulation for fricatives (which don’t have a controlled (upper) xO) is a superset of the set of possible places of articulation for stops (where the (upper) xO is controlled). Specifically, besides the velar [x] and dental [θ], there is another fricative which could very well be considered empty (i.e. containing no melodic annotations): [s].[38] I thus propose that (38) is the representation of [s].

[36] Assuming a fseq-based representation (see footnote 55), a (voiceless) glottal fricative might be the realization of a structure consisting of a single functional projection corresponding to the current topmost OP layer.

[37] The adjoined x is obviously not licensed in (34b) either. This is another way to look at the “openness” of Putonghua [ə] (cf. Živanović and Pöchtrager 2010).

[38] For example, taking Polgárdi’s (2017) representation of [s] (**AH**) and removing elements absent in GP 2 leaves us precisely with nothing.

(38) [s]

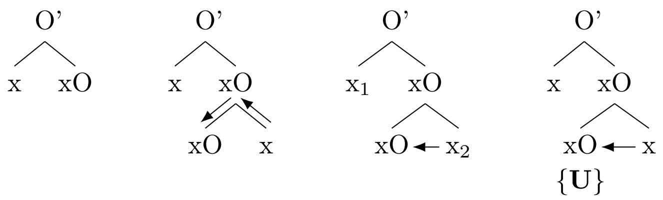


The beauty of structure (38) is that it contains no control relation. Given our proposal from §3.1, we thus immediately predict that [s] cannot occur as the first member of a branching onset.

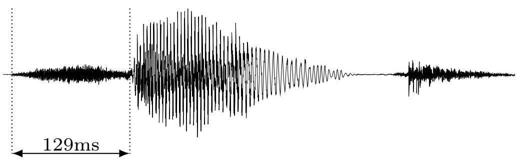
To the best of my knowledge, we have now, for the first time ever, provided an independently motivated internal (substantive) representation of [s] which explains why it cannot occur in branching onsets.[39] Much work remains to be done, of course. While we have deduced that sC cannot be branching onsets, we still have to show what they are, i.e. we need to employ the proposed representation in a positive way, to show that it fits neatly into a particular (yet to be discovered) higher structure. The situation is not unlike in Kaye (1992), where he first shows that sC cannot be branching onsets and then proposes the best remaining option, that they are coda-onset clusters with the magical (read: not understood) property of p-licensing the preceding nucleus. The difference between Kaye (1992) and the current proposal is twofold. First, while he provides empirical data arguing that sC are not branching onsets, we deduce his conclusion from independently motivated representations of branching onsets and places of articulation. Second, while GP 1 offered a single further possible representation of sC clusters, the hierarchical structures of GP 2 leave much space for improvisation. The world of GP 2 structures yielding adjacent consonants awaits our further research (see §9).

The representations (39) bear direct correlation to the acoustic signal (40)–(41). [x], corresponding to the the only structure without adjunction, is notably shorter than the others. Among the latter, [s], the only sound without a controlled head, has a greater amplitude than the others (is uncontroversially regarded a strident). The most problematic aspect of the representation–acoustics correspondence seems to be the unclear role of m-command: first of all, it does not contribute to length; second, even though we could ascribe the greater amplitude to m-command, the control-based correspondence given just above does the job just as well. See also footnote 3.

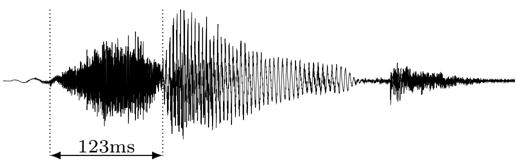
(39) a. [x] b. [s] c. [θ] d. [f]



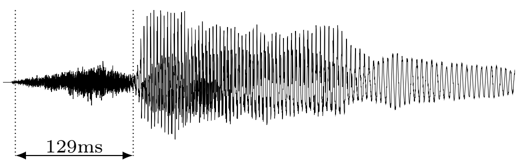
(40) a. [θ] think



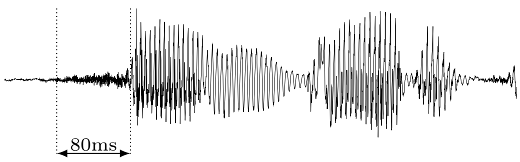

b. [s] sink



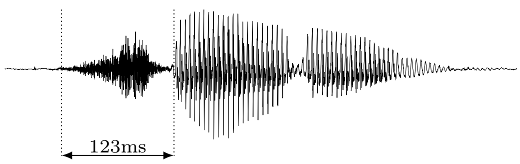

c. [f] film



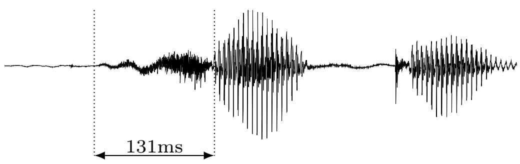

(41) a. [x] hambur(ger) 'hamburger'




b. [s] sara (name)




c. [f] fata (name)




[39]Typically (see e.g. Cyran 2010: §3.4), authors attack sC clusters "from the outside," e.g. by proposing the structure of the clusters themselves.

## 6 I don’t believe in magic (act 2)

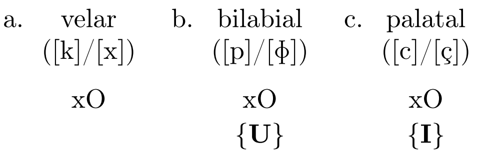
Tba. Someday. Maybe. I hope so.

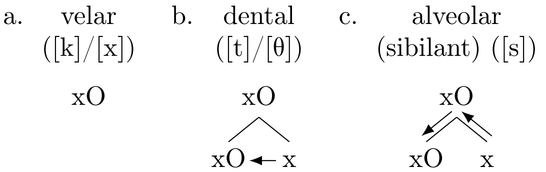
We need to figure out how m-command in the representation of [s], [ʃ] and [ɕ] gives them their magical properties.

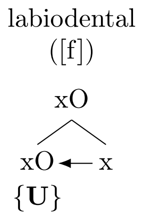
## 7 Tell me where

First, a disclaimer. Although the list of places of articulation we will generate in this section matches the IPA chart quite spectacularly, the representations should still be taken as tentative. Much empirical work needs to be done to provide evidence for both the structure and the melodic content of different places of articulation. Furthermore, the details of the representational system hinted at in footnote 55 will undoubtedly play a major role in postulating the appropriate (universal and language-specific) restrictions.

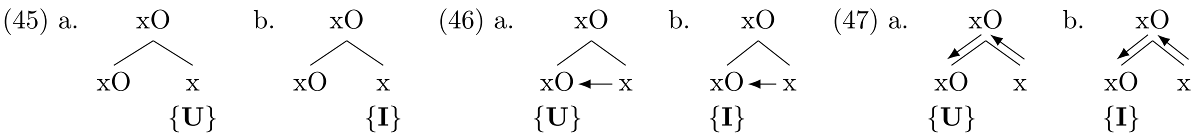
Let’s take stock by repeating the representations for place of articulation (i.e. the xO-parts of the proposed representations) we have seen so far. We have been considering simplex structures (42), structures without annotations (43) and [f] (44).

(42)



(43)



(44)



Let us now list (45)–(47) all the possible split xOs with a single annotation.[40] Absent from the list are unannotated xs which neither control or m-command, and annotated xs which either control or m-command. The former are excluded by licensing requirements (A7)–(A8), the latter by requirements that controllers (A2) and m-commanders (A10) be unannotated.




We need to match the above representations to the remaining places of articulation. According to IPA (1999), these are retroflex, uvular, pharyngeal, palato-alveolar and alveolo-palatal.[41] Note that the number of structures is a perfect match to the number of yet-to-be-represented places of articulation, a fantastic corroboration of the proposal.

Obviously, we want to assign the structures with m-command (47) to [ʃ] and [ɕ], as they exhibit s-like behaviour in consonant clusters. An example of a language utilizing all three s-like fricatives ([s], [ʃ] and [ɕ]) is Polish (Cyran 2010: fn. 67). Modulo voicing contrast, I’m not aware of any language having more than three “magic” consonants.[42]

Wanting to adopt structures with m-command for the magic fricatives, we are faced with the necessity of endowing one of [ʃ] and [ɕ] with element **U**, no matter how palatal they both are. The obvious choice seems to be to assign **U** to [ʃ] and **I** to [ɕ]. One argument is the acoustic impression of [ʃ] being darker/lower, and low frequency is an acoustic correlate of **U** but not **I** (Harris 1994: 140). A phonological argument can be provided by Putonghua. While Ferme and Živanović (2006) and Živanović and Pöchtrager (2010) attribute **I** to both [ʃ]

[40] I believe that linguolabials are the only stops that will require a doubly annotated place of articulation. However, our current representational system is inadequate to represent them without overgenerating the number of places for fricatives; see footnote 55.

[41] We intentionally disregard several places of articulation here. Epiglottals and pharyngeals are most likely phonologically non-distinct. For glottals, linguolabials and co-articulated consonants, see footnotes 36 and 40 and section 9, respectively.

[42] This actually presents an argument (contra Živanović and Pöchtrager 2010) against allowing annotated m-commanders. Allowing them would yield additional places utilizing m-command.

and [ɕ],[43] it is important to note that [ɕ] shows much more clearly that it contains **I**, by inducing an onglide and/or colouring the nucleus; the presence of **I** in [ʃ] is assumed to explain the *absence* of i-rhymes (via *No self c++command* universal) — an issue that will require new explanation in the proposed system.

We have already assigned (46a) to labiodentals: as [f] can occur as the first member of a branching onset despite being a fricative, it must contain a control relation within its place definer. Let us use the same method to determine which of the three remaining places of articulation (retroflex, uvular and pharyngeal) corresponds to structure (46b).

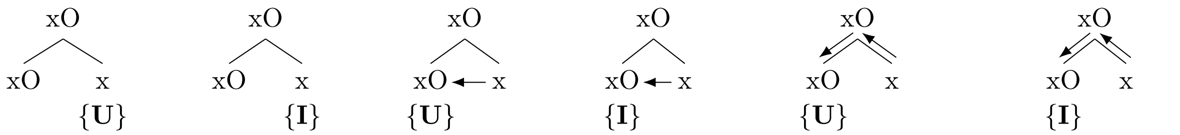
To the best of my (in this case, truly poor) knowledge, neither retroflex nor pharyngeal fricatives can occur as the first member of a branching onset. For extensive investigations on retroflexes without a single mention of a branching onset containing a retroflex fricative, see Hamann (2003) and Arsenault (2012). For pharyngeal fricatives, I've combed through an Abaza–Russian dictionary (Тугова 1967).[44] While the language has a number of truly impressive word-initial consonant clusters,[45] there is a calm island of familiar clusters, the branching onsets,[46] which most certainly doesn't contain clusters starting by a pharyngeal fricative.[47]

This leaves us with uvulars as the only remaining candidate for (46b). Looking at Abaza again, this seems to be right. We get word-initial [χl], [χr] and [ʁr] (no [ʁl], though).[48,49] In Itelmen (see §4.2), where all branching onsets are loaned from Russian (which has no uvulars), word-initial [χ]C branching onsets (actually, all clusters) are absent.

Having **I** in uvulars also seems right. In Welsh, [k] undergoes aspirate mutation into [x] in some (lexically triggered) environments, e.g. *ci* [kiː] 'dog' vs. *ei chi* [i xiː], but then also tends to be pronounced with the uvular [χ], [i χiː] (Cyran 2010: 52–53; see also Ball and Fife 1993: 304–305, 307).

The last issue is to match retroflexes and pharyngeals with structures (45a) and (45b). Given that a common (cross-linguistic) acoustic characteristic of retroflexes is lowered F3 (Hamann 2003: §3, see also Bakst 2012 for a similar, but less definite conclusion) and that low frequency is an acoustic correlate of **U** but not **I** (Harris 1994: 140), we assign (45a) to retroflexes and (45b) to pharyngeals. We have finally arrived at the picture in (48).

(48) a. retroflex ([ʈ]/[ʂ]) b. pharyngeal ([ħ]) c. labiodental ([f]) d. uvular ([q]/[χ]) e. palato-alveolar (sibilant) ([ʃ]) f. alveolo-palatal (sibilant) ([ɕ])



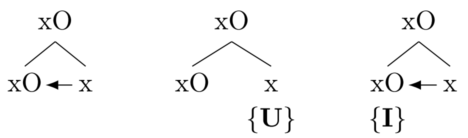

Note that the proposed system did not simply predict the correct number of places of articulation. At least at first sight, it also seems that we have predicted correct properties of the places (ability to occur as $O_1$ or not, being magic, containing an appropriate element).

According to IPA (1999), the places of articulation that are available for stops are the following: velar, dental/alveolar, bilabial, palatal, retroflex, uvular. We repeat the representations (place-defining xO-part only) in (49)–(50).

(49) a. velar ([k]/[x]) b. bilabial ([p]/[ɸ]) c. palatal ([c]/[ç])

| a. | b. | c. |
|---|---|---|
| xO | xO | xO |
| | {**U**} | {**I**} |

(50) a. dental ([t]/[θ]) b. retroflex ([ʈ]/[ʂ]) c. uvular ([q]/[χ])

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[43]Both approaches differentiate the two consonants by the status of **I**. The former (GP 1) approach assumes head–operator distinction, the latter head–x annotation.

[44]The method leaves much to be desired. It is impossible or very hard to know, for example, of any epenthetic schwa popping up, or how much morphology is involved in a particular form.

[45]The rule of the thumb seems to be, all is good if it contains a labial(ized) segment.

[46]Many, if not most of branching onsets in Abaza seem to be Russian loanwords.

[47]In fact, word-initial [ħ]C and [ʕ]C clusters are completely unattested in Abaza. Unless the pharyngeal is labialized. Of course.

[48]In a hilarious contrast to the "weird clusters" (see footnote 45), word-initial [$χ^w$]C and [$ʁ^w$]C are out. However, [$χ^j$]C and [$ʁ^j$]C are ok. Go figure.

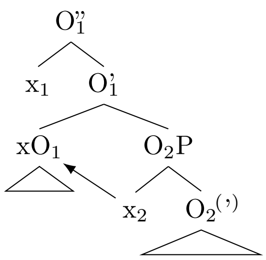
[49]It might be that Abaza doesn't have uvular, but velar fricatives. (It has stops at both places.) Sources differ, but let's trust Nikolayev and Starostin (1994: 196) over various internet sources citing (or not) literature I could not get a hold of.

While the simplex system (49) is **U**–**I** symmetric,[50] the split xO system (50) is not. When the upper xO is controlled, **U** and **I** can (only) annotate x and xO, respectively. It seems we have added yet another detail to the growing list of **U**–**I** asymmetries.

## 8 The dark side of a branching onset

In §3.1, we have shown (i) that the control relation between an $O_2$P-internal skeletal point and $xO_1$ makes $O_2$ a sonorant and (ii) that the controller must be immediately dominated by $O_2$P. The latter means that a representation of a branching onset conforms to the template in (51).

(51)

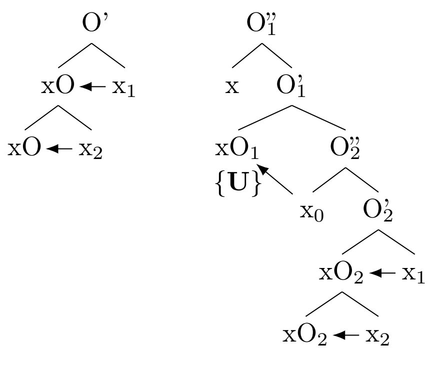



In this section, we will explore two possible ways to achieve this. Both of them have both virtues and problems. The first one (extending $O_2$P with an additional layer) conforms perfectly to the assumptions made in the paper, but allows unbounded OP recursion. The second one (allowing double control) introduces some technical complications and predicts nasals as possible $O_2$s, but seems somewhat more elegant and better suited for integration into a possible new representational system we will hint at in footnote 55 at the end of this section.

### 8.1 Additional layer

One idea is to "extend" the representation of [l] with an additional layer by merging it with an unannotated skeletal point ($x_0$) and let $x_0$ control $xO_1$ (52b). Interestingly enough, we predict that the interpretation of the "extended" consonant ($O_2''$ in (52b)) is the same as the interpretation of the original one (O' in (52a)). Nothing has really changed: $xO_2$ is still a split (unannotated) head with a controlled lower part (coronality); the upper $xO_2$ is still controlled (stopness); yes, we have added an extra skeletal point $x_0$, which "threatened" (A15) to make the structure an obstruent, but as $x_0$ was made to control out of $O_2''$, it has enclosed it(self) into a control island, making $O_2''$ a sonorant ("again"). Precisely the same logic will apply whenever we extend the to-be-embedded structure by a skeletal point only to make this point (upward) transgressively control.

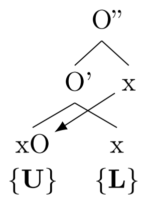
(52) a. [l] b. [pl]

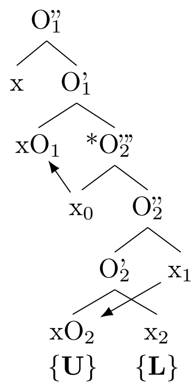



We predict that nasals cannot occur as $O_2$ of a branching onset. Nasals are two-layered structures. The extension trick cannot be used, because the number of onset projections is limited to two (Pöchtrager 2006: 97).

[50] Actually, a representational system (see footnote 55) that could create an asymmetry within the simplex system could be advantageous, as [p] and [c] have quite different properties, e.g. [p] being more common cross-linguistically.

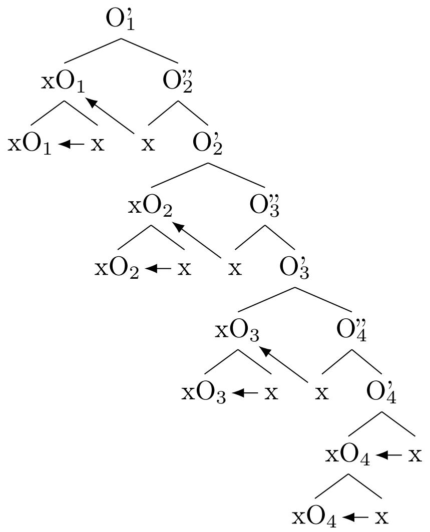
(53) a. [m] b. [km] (a failed attempt at being a branching onset)




Unfortunately, the extension approach does not prevent unbounded OP embedding.

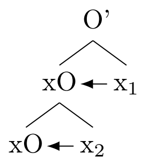
(54) *[llll] (overgeneration)



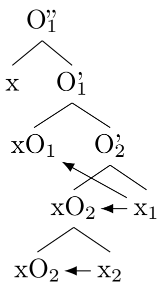

## 8.2 Double trouble

An alternative way to get a sonorant's topmost x to control out of $O_2$P is to allow a skeletal point to control more than once,[51] as shown in (56). This means that we need to understand each of the licensing *mechanisms* (A8) as one licenser, as stated in (A7').

(55) [l]




(56) [pl]




(A7') Every skeletal point must be licensed by exactly one licensing mechanism.

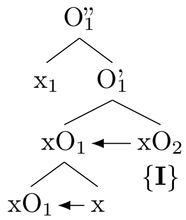
Given that an approximant can occur as the second member of a branching onset, zero-layered structures (annotated or not) must be able to function as inner OPs. However, structure (51) is misleading when it comes to a zero-layered structure as an $O_2$P. A zero-layered structure is simply an [xO] and contains no (unannotated) skeletal points, which are, according to (A1), the only possible source of control. We thus have to assume that a non-projecting xO can control as well (A2'').[52] The structure of [tɾ], for example, is then (57).

[51] Controlling more than twice is impossible due to a conspiracy of conditions on c++command (D4) and locality of control (A4').

[52] What I really have in mind is that an xO is not a simplex structure after all, but is rather composed of an x and a (possibly annotated) O: $[_{\text{xO}}$ O x] (see footnote 55). x's c++command domain will reach out of the OP precisely when OP = xO (remember that only for the highest terminal in a maximal projection, the c++command domain is larger than the c-command domain), thus making x a potential controller. With such setup, we can revert back to the original and more appealing (A2').

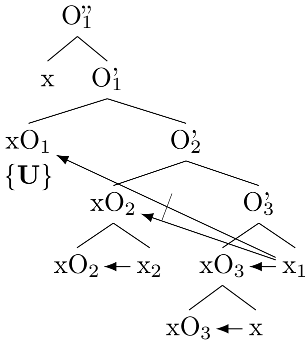
(A2'') Any unannotated skeletal point or non-projecting terminal[53] xH which c++commands node $\alpha$ is a *potential controller* of $\alpha$.

(57) [tj]

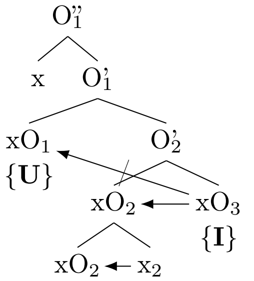



We correctly predict branching onsets to be restricted to two members.[54] This is so as c++command can "reach at most two nodes up:" just enough to be able to control the parent xO, but not enough to control the grandparent xO (58). In case of a controlling (non-projecting) head, note that (D4b) never applies to heads (i.e. the c++command domain of a head always equals its c-command domain), so (59) is illicit.

(58) *[pll]

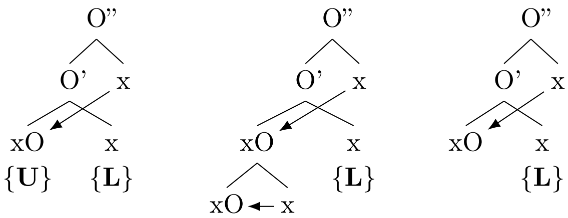



(59) *[plj]




We face a problem with nasals, their structures repeated in (60). They conform to the $O_2P$ template in (51), but do not occur as the second member of a branching onset as we would expect. At this point, we cannot do much else but stipulate (A18).[55]

(60) a. [m] b. [n] c. [ŋ]




(A18) A daughter of the second onset projection (O'') cannot control twice.

## 9 Tantalizing possibilities

GP 1 provided three types of structure for representing a (two-segment) consonant cluster: branching onsets, coda–onset clusters (including the magic sC subtype) and so-called bogus clusters (with an intervening p-licensed nucleus). While bogus clusters (well, proper government, in fact) still await their upgrade to GP 2, Pöchtrager (2006: §6) took a stab at coda–onset clusters and this presentation takes on branching onsets. However, given our fancy new hierarchical representations, we need to ask ourselves if that's all there is. Note that what we really

[53] We probably need to restrict xH controllers to lower/simplex heads.

[54] Note that we don't prevent unbounded complex onsets per se, leaving the issue for further research.

[55] I believe that a genuine explanation of "the complement of O' cannot control more than once" (and many other issues mentioned in the text) might arise if we move (yet again) further towards representational systems of modern generative syntax.

The seminal work of Cinque (1999) has launched much work in the so-called cartographic approach, which convinced many syntactitians that syntactic structures are much more fine-grained than previously imagined. While the structure of the clause in Government and Binding Theory is CP>IP>VP (Haegeman 1994), Cinque (1999: 106) arrives at the universal clausal functional sequence (fseq) numbering 30 members, and the subsequent work has pushed this number even higher, maybe up to about 200 projections (Starke 2006).

I don't believe that the phonological functional sequence, once we establish it, will approach the syntactic fseq in length, not by far. Actually, it is my intuition that the structures proposed by Pöchtrager (2006) and subsequent work on GP 2 are just about the right size, about 3 layers. I believe that the root of our problem is that we are often forced (as above) to state our assumptions in terms of projection levels. For example, in a fseq-based representation, we can clearly see the difference between $[_{f_2P}\ f_2\ [_{f_1P}\ f_1\ X]]$ and $[_{f_3P}\ f_3\ [_{f_1P}\ f_1\ X]]$. In a system based on projection levels, the difference between them is blurred: they are both two-layered structures. The appeal of the fseq-approach to phonology is not in decomposition, but rather in the ability to label each layer of the structure.

did in §3 is explore one single way of creating a complex onset, namely the situation where the embedded onset controls the head of the outer one. Read (A16) again to note that we have not *required* control transgression. So, are there other ways of embedding OPs within OPs? Or, more relevantly, do we *need* other ways?

I believe the answer is a resounding yes. Clearly, languages abound in “weird” clusters, perplexing phonologists of all flavours. English is too well-behaved to give us a problem (other than the magic sC), so let’s work on Slovene. What is the GP 1 type of Slovene *hC clusters* (61)? (Assuming that all hC clusters belong to the same type, by no means an innocuous assumption.) At first sight, the clusters in (61a) look like branching onsets, but (61b), and even more so (61c) and (61d), speak against that. They furthermore cannot be bogus clusters, as this would entail existence of word-initial sonorant–obstruent clusters, which are unattested in Slovene; i.e. Slovene is not an anything-goes language in the sense of Scheer (2007). If they are coda–onset clusters, they must be of the magic subtype. Unfortunately, Slovene is not nice enough to provide us a test in the spirit of Kaye (1992) and none of the (alive) languages tested in there contains a velar fricative, so we cannot even apply Kaye’s (1992) uniformity principle. But we can still comb through the lexicon and observe that (although they are too varied to be branching onsets) hC clusters don’t exhibit the whatever-as-the-second member attitude of sC clusters.[56] In a nutshell, Slovene hC clusters belong to no GP 1 consonant cluster type.

(61) a. i. hrib [xrip] ‘hill’, ii. hladiti [xladiti] ‘to cool’, iii. hvaliti [xʋaliti] ‘to praise’

b. i. hmelj [xmel(j)] ‘hops’, ii. ?hnotav [xnotaw] ‘hesitant’

c. hčera [xt͡ʃera] ‘daughter’

d. hkrati [xkrati] ‘simultaneously’

It is a good thing then that our proposal predicts that velar fricatives cannot occur as the first member of a branching onset: their (non-split) xO must not be controlled. (In fact, this is also predicted by GP 1, by applying the complexity criterion, one of the few links between substantive and formal requirements on branching onsets.) And while we currently cannot really explain how hC clusters work, we can at least determine the key property that makes them possible: the simplex, non-split xO of the velar place of articulation (62). It is not unreasonable to expect that further developments of the phonological syntax (see footnote 55) will provide means to put extra material in the “slot” created by the absence of adjunction.[57]

(62) [x]

O’

x xO

The velarity hypothesis receives empirical support in the fact that in Slovene, not only the velar fricative but also velar stops are special, enjoying extra combinatory freedom compared to other stops. Velars fare much better especially when it comes to clusters with nasals: there is many more of them (the ratio of velar–nasal vs. other consonant–nasal clusters is about ten to one), they generally occur in more frequent words, they replace coronals in some dialects (e.g. [dnar] → [gnar] ‘money’, both colloquial) etc.[58]

Actually, the situation is far from limited to Slovene. Moving away from Slavic, where the relative freedom of velars is quite common, we notice that German velar stops also occur in extra consonant clusters. In particular, German allows nasals as $O_2$ only with velars (63).[59,60]

(63) a. Gnade [gnaːdə] ‘grace’ b. Knie [kniː] ‘knee’

The final argument in favour of the velarity hypothesis is the fact that co-articulated consonants are, by and large, something–velar (IPA 1999).

A big speculation: affricates might share the “simplex” property with velars. In Slovene, there are several very natural-sounding word-initial affricate–nasal clusters (64). In German, only [t͡s] can precede [ʋ] (65).

(64) a. cmok [t͡smok] ‘dumpling’ b. cmeriti (se) [t͡smeriti] ‘to cry’

(65) a. Zwiebel [t͡sʋiːbl̩] ‘onion’ b. zwei [t͡sʋai̯] ‘two’

[56] The lexical argument is admittedly weak, as the situation might be simply due to diachrony.

[57] A further question, both empirical and theoretical, is whether annotated simplex xOs (bilabials, palatals) also enjoy (some of the) velar’s freedom. On the empirical side, there are some indications that this might be the case, cf. the famous *pneu-* root, (66a-ii) below etc. On the theoretical side, the question might translate to whether annotation is structural. If not, annotated bilabials and palatals must provide the same amount of “extra” space as unannotated velars; otherwise, we get a follow-up question whether there is still any space left after merging an element to the head (see footnote 55).

[58] There are a few embarrasing word-initial stop-stop (pt, tk, gd) and stop-fricative (ps, pš, ks) clusters. (Is it perhaps relevant that the one and only voiced cluster begins with a velar?)

[59] The only exception to this generalization is root *pneu-*.

[60] As German [x] only occurs as the allophone of [ç] after back vowels (Gussmann 2002: 59–63), we cannot find it word-initially.

I'm closing off by presenting a problem that put my thoughts on branching onsets in motion in the first place. It is about Slovene initial consonant clusters. Even after putting aside sCC(C)- and [w]CC(C)-initial words,[61] we are left with several 3-member initial clusters (66).[62,63] The idea was to develop a system where precisely these would fall out as possible 3-member branching onsets.

(66) a. Clj: i. ključ [kljut͡ʃ] 'key', ii. pljuča [pljut͡ʃa] 'lungs'

b. Cnj: i. knjiga [knjiga] 'book', ii. gnjaviti [gnjaviti] 'to bother'

c. Cvr: cvreti [t͡sʋreti] 'to fry'

However, 3-member branching onsets were impossible in GP 1 and remain impossible in the current proposal, despite the initial motivation. Nonetheless, if the idea that hC are a novel type of a consonant cluster works out, the solution becomes obvious: clusters in (66) are an amalgam of two different ways of creating consonant clusters. For example, *cvr* is then to be analyzed either as a branching onset being embedded in a hC cluster *c(vr)*, or vice versa *(cv)r*.

## 10 Conclusion

In this presentation, we have proposed a representation of branching onsets within the **A**-less version of GP 2. To achieve this, we first (re)encoded stopness (A14) and obstruency (A15) in terms of (somewhat redefined) control. Branching onsets were then characterized as complex OPs in which the head of the outer $O_1P$ is controlled from within the embedded $O_2P$ (§3). In §4, we have (quite) successfully tested an immediate empirical prediction that bilabial fricatives cannot occur as the first member of a branching onset.

Structural restriction (A17), hypothesized to account for the missing place of articulation in stops, led us to the representation of [s], which has a clear property that it cannot occur as the first member of a branching onset. This talk is therefore, to the best of my knowledge, the first to explain the absence of sC branching onsets based on an independently motivated representation of [s], thereby solving at least the negative part (what sC clusters are not) of Kaye's (1992) magic puzzle. The positive part, namely how to actually represent sC clusters, remains a further research question, but I'm confident that the new representation of [s] brings us much closer to its resolution.

The proposed system has been further used to generate the list of places of articulation (for fricatives), the generated list matching the IPA chart too closely to be an accident.

In the tentative sections, we first took a closer look at the source of the transgressing control relation. Finally, we emphasized that the hierarchical structures of GP 2 might provide further OP-embedding possibilities. In particular, we tried to identify hC clusters, where the first member is a velar or an affricate.

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[61] Most of sCC(C)- and possibly all of [w]CC(C)-initial words in Slovene are morphologically complex, probably involving analytic morphology. The relevant prefixes (all perfective verbal, translations extremely tentative): [s/z], [w/u] 'in(to)', [(w/u)(s/z)] 'from'.

[62] (66a) and (66b) provide Standard Slovene pronunciation. It is worth emphasizing that the standard pronunciation of (written) *lj* and *lj* as [ʎ] and [ɲ] is prescribed only word-finally and preconsonantally (Toporišič 2000: 75–76). In colloquial speech and dialects, simplification into [l]/[n]/[j] in (some or all) positions is common.

[63] There is also *dlje* [dljɛ] 'farther', but it sounds quite formal.

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