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Onset sonority constraints and subsyllabic structure

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1. Introduction[1]

One widely encountered view of phonological theory holds that phonological constraints, rules, or processes should be related to functional factors – for example, phonetic or psycholinguistic factors – whenever possible.[2] Archangeli and Pulleyblank (1994) introduce the term "functional grounding" for this kind of relationship between phonological proposals and substantive factors. However, once functional grounding is taken to be a desired component of phonology, certain questions arise: To what extent should a phonological theory be functionally grounded? Where does this view of phonology lead? Is there in fact any role for formal, symbolic, or abstract representations in phonology?

In this paper, I examine the interplay between formal and functional aspects of phonology with regard to onset sonority constraints. I argue that a functionally grounded account of liquid-specific onset prohibitions is possible, but only if constraints on onset sonority are defined with reference to formal properties of syllable structure. Onset sonority constraints must be sensitive to the structural distinction between *true onset glides*, which are pre-peak glides dominated by a syllable node, and *nuclear onglides*, which are pre-peak glides dominated by a mora – a structural distinction for which there is independent cross-linguistic support. Defining onset sonority constraints in terms of formal syllable structure solves a problem with typological predictions that would otherwise force us to abandon a functionally grounded approach to onset sonority effects. (See Archangeli and Pulleyblank [1994], Hayes [1999], Bermúdez-Otero and Börjars [2002], and Smith [2002] for further discussion in support of the claim that phonology is functionally grounded, but is still a formal system.)

While the analysis and argumentation presented here are developed in the framework of Optimality Theory (Prince and Smolensky 1993; McCarthy and Prince 1995), the conclusions that are drawn about the relationship between formal and functional factors are independent of this framework. That is, if liquid-specific onset restrictions are to be given a

functionally grounded account, based on the sonority hierarchy, then a formal distinction between the two types of glide syllabification is an essential element of the analysis.

First, §2 provides theoretical background, presenting the *ONSET/X constraint family and discussing its relationship to functional grounding. §3 discusses the typological predictions of the *ONSET/X family and explains why it appears problematic under this approach to account for languages that prohibit liquids, but not glides, in syllable-initial position. §4 proposes a solution to this problem, based on the distinction between true onset glides and nuclear onglides. The proposed analysis is applied to two related dialects of Campidanian Sardinian, and independent evidence is presented in support of the crucial distinction between the two different syllabic positions for glides. Finally, conclusions are given in §5.

2. Functionally grounded onset sonority constraints: *ONSET/X

Cross-linguistically, low-sonority onsets are preferred. This preference can be most clearly seen when a choice must be made between two different available onsets. For example, in Sanskrit reduplication, it is the lowest-sonority member of an onset cluster that is reduplicated (Steriade 1982, 1988; McCarthy and Prince 1986). Another example can be found in child-language phonology; various children have shown a preference for low-sonority onsets in phenomena such as cluster simplification (*blue* > [buː], *sky* > [gaɪ], *snow* > [soʊ] and truncation (*balloon* > [buːn]) (Gnanadesikan 1995; Barlow 1997).

Moreover, there is a functional motivation for this preference. The auditory system is particularly sensitive to rapid changes in spectral patterns (Stevens 1989; Ohala 1992; Delgutte 1997; Warner 1998). A low-sonority onset is preferred because it is more distinct from the syllable nucleus than a high-sonority onset would be (Delgutte 1997). This means that the cross-linguistic preference for low-sonority onsets, however it is to be modelled within a particular phonological framework, is functionally grounded.

This section first outlines a phonological approach to the low-sonority onset preference (§2.1) and then demonstrates, with a case study, how the approach is implemented (§2.2).

2.1. The *ONSET/X constraint subhierarchy

Within Optimality Theory (Prince and Smolensky 1993; McCarthy and Prince 1995), the preference for low-sonority onsets can be formalized as a family of constraints of the general type *ONSET/X, where X is a variable that ranges over each step of the segmental sonority scale. (This proposal is a modified version of the *MARGIN/X subhierarchy of Prince and Smolensky [1993], which applies to all margin or non-peak segments within the syllable. Since preferred codas are often those that are high in sonority [Hooper 1976; Zec 1988; Clements 1990], it is preferable to treat onset and coda sonority restrictions separately.) The individual *ONSET/X constraints are in a universally fixed ranking[3] determined by the sonority scale, with the highest rank given to the constraint against the most sonorous onset.

The *ONSET/X subhierarchy assumed here is shown in (1).

(1) *ONS/GLIDE >> *ONS/RHOTIC >> *ONS/LATERAL >> *ONS/NASAL >> *ONS/VOICEDOBST >> *ONS/VCLSOBST

The sonority scale arguably includes further distinctions beyond those shown in (1), including vowel height and continuancy in obstruents (Dell and Elmedlaoui 1985, 1988). These additional distinctions are not relevant for the languages discussed below, so they are set aside here. For evidence in favor of a sonority distinction between rhotics and laterals, see Espy-Wilson (1992), Devine and Stephens (1994), and Zec (1995). This distinction is further supported by some of the languages to be discussed below, which ban high-sonority onsets, including rhotics, but allow onsets that are lower in sonority, including laterals.

The *ONSET/X constraints must be given a constraint formulation that correctly identifies the (leftmost) onset segment in a syllable and inspects its sonority level.

(2) *ONSET/X — The leftmost "onset segment" in a syllable does not have sonority level X

The meaning of *onset segment* in (2) needs to be made precise. It will be argued in §4 below that a characterization of *onset* simply as *pre-peak segment*, while attractive for its surface-oriented nature and minimal reference

to abstract syllable structure, is in fact inadequate. The characterization ultimately to be adopted is one that makes reference to moraic structure.

What is appealing about the *ONSET/X subhierarchy is that, because this subhierarchy (with its fixed ranking) is based on the sonority scale and the perceptual preference for low-sonority onsets, it is functionally grounded.

2.2. Case study: Sestu Campidanian Sardinian

A phonological analysis of onset sonority restrictions based on the *ONSET/X subhierarchy is now given for the Sestu dialect of Campidanian Sardinian (Bolognesi 1998[4]). Sestu has a ban on word-initial rhotic onsets and glide onsets, but other word-initial onsets, including laterals, are permitted.

(3) Rhotic and glide onsets banned in Sestu

(a) Expected [r]-initial words (Bolognesi 1998: 42)

arːɔza	'rose'	< Lat. *rosa*	arːiu	'river'	< Lat. *rivus*
arːana	'frog'	< Lat. *rana*	arːiku	'rich'	< Ital. *ricco*
arːuβiu	'red'	< Lat. *rubeum*	arːaðiu	'radio'	< Ital. *radio*
arːɔða	'wheel'	< Lat. *rota*			

(b) Expected [j]-initial words (Bolognesi 1998: 44)

Sestu form		*Other Campidanian dialects (including Iglesias; see below)*
ajaju	'grandfather'	jaju
ajaja	'grandmother'	jaja
dʒu	'yoke'	juu

(c) Initial laterals, nasals, obstruents (Bolognesi 1998: 30, 41, 43–4)

luʒi	'light'	nazu	'nose'
ledʒu	'ugly'	femina	'woman'
latːi	'milk'	bia	'road'
luðu	'mud'	konilːu	'rabbit'

In Sestu (as well as in the related dialect of Iglesias, discussed below), the onset sonority restrictions are specific to the word-initial syllable. Therefore, a version of *ONSET/X that is positionally relativized to the initial syl-

lable (σ_1), as in (4), must be invoked. (The difference between general and positional *ONSET/X is not relevant for the points under consideration and will not be further discussed here. See Smith [2002] for a general theory of markedness constraints that have counterparts relativized to phonologically prominent positions such as the initial syllable.)

(4) [*ONSET/X]/σ_1 The leftmost "onset segment" in the initial syllable does not have sonority level X

The Sestu pattern is analyzed as follows. DEP, the constraint against epenthesis (McCarthy and Prince 1995), is ranked above all [*ONSET/X]/σ_1 constraints except [*ONSET/GLI]/σ_1 and [*ONSET/RHO]/σ_1. Therefore, only potential glide and rhotic onsets can compel the insertion of a prothetic vowel. This ranking is demonstrated in (5) (► indicates the optimal candidate in each tableau).[5]

(5) Sestu examples

(a) Initial glide onsets avoided: [ajaju] 'grandfather'

/jaju/	[*O/GLI]/σ_1	[*O/RHO]/σ_1	DEP	[*O/LAT]/σ_1
a. jaju	*!			
►b. ajaju			*	

(b) Initial rhotic onsets avoided: [arːɔða] 'wheel'

/arːɔða/	[*O/GLI]/σ_1	[*O/RHO]/σ_1	DEP	[*O/LAT]/σ_1
a. rːɔða		*!		
►b. arːɔða			*	

(c) Initial lateral onsets permitted: [luʒi] 'light'

/luʒi/	[*O/GLI]/σ_1	[*O/RHO]/σ_1	DEP	[*O/LAT]/σ_1
►a. luʒi				*
b. aluʒi			*!	

Note that in Sestu, rhotics and all higher-sonority onsets, namely, glides, are banned together. This is expected, given the fixed ranking of the constraints in the *ONSET/X subhierarchy. The next section now examines the typological consequences of this fixed ranking in more detail.

3. *ONSET/X and typological predictions: A problem?

As discussed in §2.1 above, the *ONSET/X constraints are in a fixed ranking for functional reasons. This fixed ranking has consequences for the typological predictions of the analysis. Specifically, the following prediction is made: If some *ONSET/X constraint is ranked high enough to cause a faithfulness violation (as of DEP in the example above), any higher-ranking *ONSET/X constraint should also be active in the language. More generally, in theory-neutral terms: If we try to explain a ban on certain onset types by invoking the sonority scale, we automatically predict that a ban on onsets at one sonority level entails a ban on all higher-sonority onsets as well. Thus, a ban on rhotic onsets is predicted to entail a ban on glide onsets.

However, some languages ban rhotic onsets, or all liquid onsets, but still allow syllable-initial glides. Examples are listed in (6).

(6) Languages with liquid-specific onset prohibitions

(a) Liquid onsets banned in all syllables
– Seoul Korean (Kim-Renaud 1986; H.M. Sohn 1994: 440), excepting recent loanwords; also, ambisyllabic liquids, which are not syllabified exclusively as onsets, are permitted

(b) Liquid onsets banned in initial syllables
– Mongolian (Poppe 1970; Ramsey 1987)
– Kuman (Papuan; Trefry 1969; Lynch 1983; Blevins 1994)
– Guugu Yimidhirr, Pitta-Pitta (Australian; Dixon 1980)

(c) Rhotic onsets banned in initial syllables
– the Iglesias dialect of Campidanian Sardinian (Bolognesi 1998)
– Mbabaram (Australian; Dixon 1991)

Liquid-specific onset prohibitions, as in the languages listed in (6), appear to violate the typological predictions of *ONSET/X. Because of the fixed order among the constraints in that subhierarchy, allowing glide onsets would make liquid onsets acceptable too (7a), and banning liquid onsets would make glide onsets impossible as well (7b). (**X** indicates an incorrect winner; (►) indicates a desired winner that has been incorrectly ruled out.)

(7) Iglesias Campidanian: [arːɔða] ‘wheel’, but [jaju] ‘grandfather’

(a) Allowing [j] onsets makes [r] onsets possible (English, German, ...)

/jaju/	DEP	[*O/GLI]/σ_1	[*O/RHO]/σ_1	[*O/LAT]/σ_1
►a. jaju		*		
b. ajaju	*!			

	/rːɔða/	DEP	[*O/GLI]/σ_1	[*O/RHO]/σ_1	[*O/LAT]/σ_1
	X a. rːɔða			*	
(►)	b. arːɔða	*!			

(b) Banning [r] onsets makes [j] onsets impossible (Sestu Campidanian)

/arːɔða/	[*O/GLI]/σ_1	[*O/RHO]/σ_1	DEP	[*O/LAT]/σ_1
a. rːɔða		*!		
►b. arːɔða			*	

	/jaju/	[*O/GLI]/σ_1	[*O/RHO]/σ_1	DEP	[*O/LAT]/σ_1
(►)	a. jaju	*!			
	X b. ajaju			*	

Since an account based on *ONSET/X cannot produce a pattern like that found in Iglesias, or the other languages listed in (6), how can languages like this be analysed? One possibility might be to allow the *ONSET/X constraints to be freely ranked in any order. For Iglesias, then, the ranking could be [*ONSET/RHO]/σ_1 >> DEP >> [*ONSET/GLI]/σ_1. Under this ranking, epenthesis is compelled when a word would otherwise start with a rhotic onset, but not in the case of an initial glide. However, this approach has an undesirable consequence: Because the *ONSET/X constraints have been reranked, the relationship between the *ONSET/X subhierarchy and the perceptual preference for low-sonority onsets is lost.

Another approach might be to propose a new constraint, distinct from the sonority-based *ONSET/X subhierarchy, that simply bans liquid onsets. This constraint could then be ranked as follows: “NOLIQONSET”>> DEP >> [*ONSET/GLI]/σ_1 >> [*ONSET/RHO]/σ_1. However, there is a problem here as well, in that such a constraint has no obvious functional motivation. Note that the liquid-specific onset prohibitions cannot be consistently explained by invoking the cross-linguistic preference for some kinds of liquids, such as taps, flaps, and trills, to be postvocalic. Crucially, the liquid-specific on-

set ban may extend to approximant liquids as well. For example, Mbabaram bans even [ɽ] from σ_1 onsets. This liquid is realized as "a tap, a trill, or a rhotic continuant" (Dixon 1991: 356). Likewise, as noted in (6) above, some languages ban laterals as well as rhotics from onset position, and this pattern usually involves one or more lateral approximants.

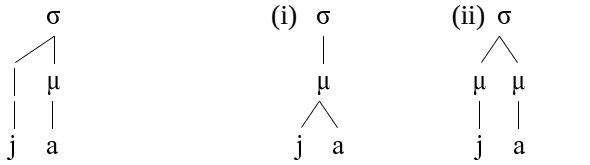
Thus, the above two strategies are both problematic because they lose the advantage of functional grounding inherent in the fixed-ranking version of the *ONSET/X subhierarchy.

4. Proposal: *ONSET/X constraints are sensitive to moraic structure

In this section, I argue that the liquid-specific onset prohibitions described above can be given a functionally grounded treatment, by means of a *ONSET/X subhierarchy that maintains its universally fixed ranking based on the sonority scale, if the *ONSET/X constraints are explicitly defined to be sensitive to the moraic status of the segments whose sonority level they evaluate. This change in the formulation of *ONSET/X constraints allows us to exploit the fact that a syllable-initial glide has two possible syllabic positions: as a true onset (8a), or as a nuclear onglide, i.e., as part of a rising diphthong (8b).

(8) Possible structures for a syllable-initial glide

(a) True onset glide (b) Nuclear onglide



(most cases) (when heavy)

The distinction between true onset glides and nuclear onglides is independently motivated, because some languages have a contrast between the two structures. For example, in French (Kaye and Lowenstamm 1984; Rialland 1994), glides in "native" words are either true onsets or nuclear onglides, depending on the following vowel; glides in recent loanwords are

true onsets. Evidence for the distinction in French comes from facts about cluster phonotactics – a nuclear onglide is compatible with a preceding onset cluster, but a true onset glide is not – and from allomorphic alternations that are sensitive to the distinction between onset and nuclear segments. In Spanish (Harris 1983; Hualde 1989; Harris and Kaisse 1999), glides are true onsets when no other onset consonant is available; otherwise, they are nuclear onglides. Evidence for the distinction in Spanish comes from facts about syllable weight: glides add weight when they are nuclear, but not when they are true onsets. Other languages that support the distinction between the two types of glides are Slovak (Rubach 1998; Harris and Kaisse 1999) and English (Davis and Hammond 1995).

The *ONSET/X constraints can be made sensitive to the distinction between a true onset segment, as in (8a), and a nuclear segment, as in (8b), if they are defined to evaluate only non-moraic segments, as in the constraint formulation given in (9).

(9) Revised definition of *ONSET/X constraints; cf. (2)

*ONSET/X	The leftmost pre-peak **non-moraic** segment in a syllable does not have sonority level X

Once *ONSET/GLI has the formulation in (9), it is no longer the case that all syllable-initial glides violate this constraint. A glide that is syllabified as a nuclear onglide actually satisfies *ONSET/GLI, because the constraint is concerned only with non-moraic onset glides.

A coherent analysis can now be given for languages with liquid-specific onset prohibitions. They do in fact ban both liquid and glide onsets, as the universal ranking of the *ONSET/X constraints would require. These languages tolerate syllable-initial glides because they are nuclear onglides, not true onsets, and are therefore exempt from *onset* sonority restrictions.

The remainder of this section first applies this new conception of *ONSET/X constraints to the liquid-specific onset restriction in Iglesias Campidanian Sardinian (§4.1), and then presents independent evidence from Sestu and Iglesias Campidanian in support of the structural distinction between glides that has been proposed to account for the different onset restrictions in the two dialects (§4.2).

An important consequence of this proposal is that *ONSET/X constraints now refer to moraic structure, a comparatively abstract phonological representation, as opposed to something like “the leftmost pre-peak segment of a

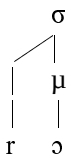
syllable," which would make it a more surface-oriented, less abstract constraint. However, there is an advantage to this approach. The constraints responsible for liquid-specific onset prohibitions like those discussed in §3 above remain functionally grounded in the sonority scale, because they can be accounted for by means of the *ONSET/X subhierarchy after all.

4.1. Implementing the proposal: Sestu vs. Iglesias

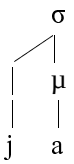
We can now consider the differences between the Sestu and Iglesias dialects of Campidanian Sardinian in light of the different possible syllable positions for glides shown in (8) above. In Sestu, rhotics and glides are both prohibited in (word-initial) syllable-initial position. This is the well-behaved case seen in §2, where a ban on rhotics is accompanied by a ban on the higher-sonority glides. This pattern indicates that glide "onsets" are true onsets in this language, because they do not escape the sonority requirements imposed by *ONSET/GLI, a constraint whose high rank is entailed by the crucial high rank of *ONSET/RHO.

(10) Structural proposal for Sestu: Glide "onsets" are true onsets

(a) Rhotics



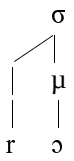
(b) Glides



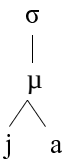
Iglesias, however, is an example of a language with a liquid-specific onset prohibition. Rhotics are prohibited in (word-initial) syllable-initial position, but glides do appear. The proposal that can now be made for this dialect is that glides are syllabified as nuclear onglides, allowing them to escape the onset sonority restriction that *ONSET/GLI would impose on a true onset glide.

(11) Structural proposal for Iglesias: Glide "onsets" are nuclear onglides

(a) Rhotics



(b) Glides



If syllable-initial rhotics and glides in Iglesias have the structure proposed in (11), then an analysis of the rhotic-specific onset restriction in this dialect can proceed as follows. As in Sestu, the ban on word-initial rhotic onsets, which are avoided through prothesis, motivates the ranking [*ONSET/RHO]/σ_1 >> DEP (12a). This ranking in turn implies [*ONSET/GLI]/σ_1 >> DEP, since *ONSET/GLI universally outranks *ONSET/RHO. But if initial glides in Iglesias are syllabified as part of the nucleus, as proposed in (11b), then [*ONSET/GLI]/σ_1 is satisfied even in words with an initial glide (12b), and this is why glide-initial words are possible.

(12) Rhotic-specific onset restrictions in Iglesias

(a) The ban on [r] onsets motivates [*ONS/RHO]/σ_1 >> DEP

/arːɔða/	[*O/GLI]/σ_1	[*O/RHO]/σ_1	DEP	[*O/LAT]/σ_1
a. rːɔða		*!		
►b. arːɔða			*	

(b) Syllabifying [j] as a nuclear onglide satisfies [*ONS/GLI]/σ_1 ({X}=nucleus)

/jaju/	[*O/GLI]/σ_1	[*O/RHO]/σ_1	DEP	[*O/LAT]/σ_1
►a. {ja}ju	√			
b. ajaju			*!	

Under this approach, Iglesias now conforms to the generalization that satisfaction of *ONSET/RHO implies satisfaction of the universally higher-ranked *ONSET/GLI, despite the liquid-specific onset prohibition found in this dialect. There is no need to look for a "new" constraint responsible for liquid-specific onset prohibitions; the functionally grounded explanation based on *ONSET/X (and thus on the sonority hierarchy) can be maintained.

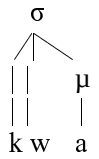
4.2. Supporting evidence for the Sestu/Iglesias structural distinction

The difference in syllabification of word-initial glides proposed for Sestu and Iglesias in the preceding section provides a way of accounting for the fact that Sestu bans word-initial glides along with rhotics, whereas Iglesias does not. This section presents additional evidence that there is indeed a difference in the syllabification of glides in these two closely related dialects of Sardinian. Crucially, Sestu and Iglesias treat glides differently in another context as well: Iglesias allows rising diphthongs (CGV), but Sestu does not. Bolognesi (1998: 24) explicitly states, "Rising diphthongs... are normally prohibited in Sestu... [T]he 'Standard' Campidanian word 'kwaḍ̻u ('horse') is realized as ku'aḍ̻u in the Sestu dialect: /u/ is short and unstressed, but distinctly longer than the corresponding glide."[6]

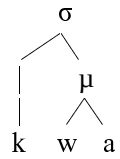
Given the two different syllabic positions for pre-peak glides shown in (8) above, there are two different possible structures for a CGV syllable. The glide can be a true onset, forming part of an onset cluster (13a), or it can be a nuclear onglide, forming a rising diphthong that happens to be preceded by an onset consonant (13b).

(13) Possible structures for CGV syllables

(a) Glide as true onset



(b) Glide as nuclear onglide



According to Bolognesi (1998), Sestu does not allow CGV syllables. This means that both (13a) and (13b) are prohibited in Sestu. An account of the impossibility of (13a) in Sestu is tangential to the present discussion. Crucial here is the fact that Sestu prohibits (13b). This confirms that Sestu bans nuclear onglides, preferring to syllabify glides as true onsets (10b).

Iglesias differs from Sestu in allowing CGV syllables, as in ['kwaḍ̻u] 'horse'. This means that this dialect must allow either (13a) or (13b), or both. It is not possible at this time to confirm that (13b), rather than (13a), is the structure involved in a form like ['kwaḍ̻u]. However, the fact that CGV syllables are possible is at least compatible with the proposal that

Iglesias syllabifies glides as nuclear onglides. (Note also that Bolognesi calls the CGV syllables found in Iglesias "rising diphthongs," suggesting that his intuition is that the glides are indeed nuclear.)

The microvariation between these two dialects can be summarized as in (14).

(14) Microvariation in Campidanian Sardinian

Sestu	**Iglesias**
1. Bans rhotic onsets in σ_1 *and* bans glide onsets in σ_1	**2.** Bans rhotic onsets in σ_1 *but* glides appear
3. Bans [C{GV}...] syllables	**4.** Allows [CGV...] syllables
►Both **1.** and **3.** are predicted if glides are true onsets	►Both **2.** and **4.** are predicted if glides are nuclear onglides

In summary, the different behaviour of CGV syllables in Sestu and Iglesias provides supporting evidence for the claim that the two dialects syllabify initial glides differently. More generally, the proposal developed here predicts that, all else being equal, a language with liquid-specific onset prohibitions should tolerate rising diphthongs or in some other way provide independent evidence that glides are syllabified as nuclear onglides. While cross-linguistic confirmation of this claim is still in progress, at least one other case may support this prediction: Korean.

In Seoul and other South Korean dialects, liquid onsets are banned in all syllables (Kim-Renaud 1986; H.M. Sohn 1994).[7] However, syllable-initial glides are allowed. In accordance with the predictions of the proposal developed here, some researchers have argued for independent reasons that syllable-initial glides are nuclear in Korean (H.S. Sohn 1987; Kim and Kim 1990). There is some controversy over the structural representation of Korean glides; see B.G. Lee (1982), Y. Lee (1994), and Yun (2001) for other views. But in any case, Korean does allow rising diphthongs, as predicted here.

5. Concluding remarks

This paper has shown that liquid-specific onset prohibitions receive a functionally grounded account if the *ONSET/X constraint subhierarchy is de-

fined with reference to formal distinctions in syllable-internal phonological structure. There are two important implications of this result. First, although the ranked and violable constraints of Optimality Theory sometimes allow us to simplify our assumptions about formal phonological structure, there is still a role for formal structure to play in our understanding of sound patterns in language. Second, a functionally grounded constraint is not necessarily one that is created directly from functional considerations. It can also be a formally defined constraint that is compatible with functionally determined criteria (see also the discussion of "Inductive Grounding" in Hayes [1999]).

Notes

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[2] Not all phonologists agree that functional grounding is a desirable characteristic for a phonological theory; for recent discussion, see Ploch (1999), Hale and Reiss (2000), and van der Hulst (this volume).

[3] See Prince 2001 and de Lacy 2002 for an alternative approach to constraints involving linguistic scales.

[4] Bolognesi's (1998) analysis of Campidanian Sardinian phonology also builds on the insight that highly sonorous onsets are disfavored. However, the implementational details of Bolognesi's analysis are quite different from those of the analysis presented here.

[5] The constraint ONSET 'Syllables have onsets' must also rank below [*ONSET/GLI]/σ_1 and [*ONSET/RHO]/σ_1. Otherwise, the creation of an onsetless syllable through prothesis would be blocked, or an initial onset would be epenthesized as well.

[6] Rising diphthongs do appear from time to time in Bolognesi's (1998) phonetic transcriptions of connected discourse in Sestu Campidanian. Compare /famil:ia/ 'family': [...mil:ia] (p 30) vs. unexpected [...mil:ja] (p 45). Since Bolognesi so explicitly states that Sestu does not have rising diphthongs, perhaps the sporadic unexpected glides in his transcriptions are to be taken as some sort of rapid-speech phenomenon.

[7] Ambisyllabic liquids are exempt from the liquid-onset prohibition. It is quite likely relevant that ambisyllabic liquids are not exclusively onsets, since they are affiliated with the preceding syllable as well.

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