Prosodic well-formedness and sonority constraints: epenthesis in Irish[1]

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1. Introduction

Early accounts of epenthesis in Optimality Theory focused on epenthesis that results from constraints on prosodic structure, that is, from syllable structure constraints or minimal prosodic category (e.g. minimal word) requirements. McCarthy & Prince (1993a) account for word-internal consonant epenthesis at V-V junctures in Axininca Campa, for example, by ranking ONSET (Syllables must have onsets) higher than the faithfulness constraint FILL (Syllable positions are filled with segmental material). Thus the input /i-N-koma-i/ *he will paddle* yields the optimal epenthesised output form i★koma𝕋i:

(1) Input = /i-N-koma-i/

Candidates	ONSET	FILL
☞ .i★.ko.ma.𝕋i	*	*
.i★.ko.ma.i	* * !	

Similarly, a constraint on the minimal prosodic structure of words in Axininca Campa, FTBIN (Feet must be binary under syllabic or moraic analysis) results in augmentation by epenthesis of monomoraic roots to bimoraicity.

Epenthesis can also be expected to result from other classes of constraints, or from the interaction of other constraints. This paper focuses on epenthesis patterns in Irish which are shown to be the result of interaction between a sonority-driven intrinsic ranking of consonant clusters and constraints on prosodic structure, specifically on foot structure. An initial set of data is presented in §2.1 and an account that refers to a universal ranking of consonant clusters in terms of 'minimal sonority distance' is proposed in §2.2. Additional data are presented in §2.3 which are prosodically more complex and which require an account that involves constraints on prosodic structure. It is shown that although the cluster constraints compel epenthesis, the higher ranking prosodic constraints are shown to constrain it. Of additional interest in the proposed account is the non-ranking of two prosodic constraints, vis. NONFINALITY and PARSE-SYLLABLE. It is shown that these constraints must crucially be unranked in Irish in order to allow the contrasting effects of different cluster constraints to emerge.

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2. Epenthesis pattern in Irish

2.1 *The data*

Certain consonant clusters are disfavoured in monomorphemes in Irish. The clusters can generally be characterised as comprising a sonorant followed by a nonhomorganic consonant.[2] Pairs of forms are given in (2) which are traditionally regarded as having undergone epenthesis, and in which the (input) clusters occur both word-finally or word-internally.[3] The nature of the cluster is indicated in the leftmost column abstracting away from whether the cluster is palatalised (indicated by C') or nonpalatalised. This distinction, a phonemic one in Irish, is not relevant for present purposes. The epenthetic vowel is /ə/ in a nonpalatalised environment, /i/ in a palatalised environment.

(2) Nonhomorganic clusters which undergo epenthesis:

a.	**-rb**	borəb	borb	*abrupt*
		bar'ibr'i	Bairbre	(name)
	-rm	gorəm	gorm	*blue*
		d'arəməd	dearmad	*mistake*
	-rf	d'arəfə	dearfa	*certain*
	-rv	tarəv	tarbh	*bull*
		s'er'iv'i:s'	seirbhís	*service*
	-rw	karəwat	carbhat	*tie*
	-rg	d'arəg	dearg	*red*
		ar'ig'əd	airgead	*money*
	-rx	dorəxə	dorcha	*dark*

[2] For alternative approaches to these data, see e.g. Ó Baoill 1980, Ní Chiosáin 1991, Cyran 1994.. For accounts of comparable data in Scottish Gaelic, see, e.g. Clements 1986, Sagey 1987, Bosch 1991, 1995.

[3] Since there are no vowel-zero alternations involving forms like those in (2), referring to an input cluster requires comment. Spreading of [back] in Irish (which represents the phonemic palatalised/nonpalatalised contrast in consonants) is strictly local, within clusters or within certain consonant-short vowel sequences, see e.g. Ní Chiosáin 1994. The **consonants** in a CVC sequence do not affect each other. An exception to this generalisation involves examples like those in (2), where (morphological) final palatalisation affects the relevant non-adjacent consonants, e.g. final palatalisation of borəb *borb* 'abrupt' yields bir'ib', *borib' *boirb*, i.e.both the ultimate and the penultimate consonants are palatalised. Compare with (i) true clusters, e.g.alt/al't', *alt/ailt* 'article' (nom/gen) where both consonants are affected by final palatalisation and (ii) non-clusters, e.g. b'olər/b'olər', *biolar/biolair* 'watercress' (nom/gen), where the penultimate consonant is **not** affected by final palatalisation. Since the consonants in the 'epenthetic' forms pattern with true clusters, it seems reasonable to posit clusters in the input forms.

b.	**-lb**	al'ib'	ailb	*alb*
		ələbə	Alba	*Scotland*
	-lm	koləm	colm	*dove*
		s'el'im'id'i	seilmide	*snail*
	-lv	s'ələv	sealbh	*possession*
		sil'iv'ir	soilbhir	*pleasant*
	-lw	g'aləwən	gealbhan	*sparrow*
	-lg	s'el'ig'	seilg	*hunt*
		ələgə	alga	*algae*
	-lx	tuləxəx	tulchach	*hilly*
c.	**-nb**	b'in'ib'	binb	*venom*
		banəbə	Banba	(a name for Ireland)
	-nm	an'im'	ainm	*name*
		m'anəmə	meanma	*mind*
	-nv	banəv	banbh	*piglet*
		an'iv'i:	ainmhí	*animal*
	-nx	donəxə	Donnchadha	(name)

The cluster rn forms an exception to the general nonhomorganicity of the consonants seen above. This cluster does not occur word-finally, (3a), but does occur word-internally, with lengthening of the preceding vowel in certain dialects (3b).

(3) Word-final vs. word-internal **-rn**:

a.	dorən	dorn	*fist*
	karən	carn	*mound*
b.	karna:n/ka:rna:n	carnán	*mound*
	darnə/da:rnə	darna	*second*

Epenthesis does not occur into clusters consisting of a sonorant consonant followed by a voiceless stop:

(4) Sonorant-voiceless stop clusters: no epenthesis

a.	**-rp**	korp	corp	*body*
		ki'rp'əx	coirpeach	*criminal*
	-rt	gort	gort	*field*
		gortə	gorta	*famine*
	-rk	k'ark	cearc	*hen*
		kir'k'i	coirce	*oats*

b.	**-lp**	alp	alp	*swallow whole*
		kolpə	colpa	*calf (of leg)*
	-lt	alt	alt	*joint*
		altu:	altú	*thanksgiving*
	-lk	kal'k'	cailc	*chalk*
		kil'k'i	cuilce	*quilt*
c.	**-nt**	kan't'	caint	*talk*
		kantəl	cantal	*irritation*

Nor does epenthesis generally occur in homorganic clusters. In addition to the homorganic rn cluster in (3), epenthesis does not occur into the cluster rl, as shown in (5).[4] The vowel preceding the cluster in (5) is long in the western (Connemara) and southern (Munster) dialects (marked C and M, respectively), and short in the northern (Donegal (D)) dialects.

(5) Additional homorganic cluster which does not undergo epenthesis:

-rl	aurla:r (C) u:rla:r (M) urlar (D)	urlár	*floor*

2.2 *Intrinsic ranking of consonant clusters*

In order to account for the permissible and nonpermissible clusters in Irish, the notion of 'minimal sonority distance' (e.g. Greenberg 1978, Steriade 1982, Harris 1983, Selkirk 1984) is adopted, which requires that linearly adjacent segments be a certain distance from each other along a defined sonority hierarchy. While it is beyond the scope of this paper to develop a theory of sonority distance, there presumably is a universal one, and the idea is implemented here with intrinsically (universally) ranked cluster constraints mnemonically called *rg and *rk, representing all sonorant-voiced consonant and all sonorant-voiceless consonant clusters, respectively.

Since in Irish, the cluster rk is, in all prosodic circumstances, permissible, it is more harmonic than the cluster rg which, in examples like those in (2), is impermissible. The cluster rk is therefore more harmonic than rg and the constraint ranking is thus: *rg >> *rk. Since epenthesis occurs into the cluster rg, *rg must be ranked higher than FILL (which would prevent epenthesis) i.e. *rg >> FILL. A high-ranking PARSE is explicitly assumed which requires that all input material be parsed: *rg cannot be satisfied by underparsing one or other constituent consonants. Candidate forms for [d'arəg] *dearg* and [ar'ig'əd] *airgead* are given in (6). Note: (i) *rg is not a constraint on complex codas, as illustrated by forms like ar'ig'əd below, where an intact cluster would be heterosyllabic; (ii) *rg is used to refer to both rg and r'g' clusters, that is, both the nonpalatalised and the palatalised clusters, respectively. This convention is adopted throughout the paper.

[4] Note that some of the (non-epenthesising) clusters in (4) are also homorganic, i.e. rt, lt, nt.

(6)

Input = /d'arg/	*rg	FILL
a. ☞ d'arəg		*
b. d'arg	* !	
c. d'argə	* !	*
d. d'a:rg	* !	*

Input = /ar'g'əd/

e. ☞ ar'i'gəd		*
f. ar'g'əd	* !	

Assuming the input form contains the cluster rg, the optimal candidate in (6)a. which contains an epenthetic vowel obeys *rg but violates FILL.[5] The faithful candidate in (6)b. however violates *rg, as do the remaining forms (6)c. and d. which both contain an additional mora (included in part to illustrate that a minimal foot requirement, e.g. FTBIN (requiring bimoraicity), is not the impetus behind epenthesis).[6]

The forms in (6) should be compared with similar forms containing the cluster rk, e.g. k'ark *hen* and kir'k'i *oats*, which do not undergo epenthesis. The cluster constraint *rk, along with the family of sonorant-voiceless stop cluster constraints, is therefore ranked below FILL and the optimal form is thus the input form.

[5] An alternative account, adopting Lexicon Optimisation (Prince & Smolensky 1993:192), would assume the optimal form to also be the input. Recall from footnote 3 that the clusterhood of, e.g. rg must be accessible at the output level. This would then require a representational difference at the output level between true CVC and epenthesised CVC. One possibility would be to treat the epenthesised vowel as the realisation of a mora that is located on the sonorant (see Ní Chiosáin 1991 for an account along these lines).

[6] That FTBIN is not what drives epenthesis in Irish is apparent from parallel forms containing the cluster rk, see (7), where epenthesis does not occur. Furthermore, there are numerous examples of monomoraic lexical (non-closed class) forms in Irish which do not undergo any form of augmentation, e.g. t'ax *teach* 'house', kat *cat* 'cat', lag *lag* 'weak', k'axt *ceacht* 'lesson', ab *ab* 'abbot', pu *puth* 'breeze', b'i *bith* 'existence'.

(7)

Input = /k'ark/	*rg	FILL	*rk
a. ☞ k'ark			*
b. k'arək		* !	
c. k'arkə		* !	*
d. k'a:rk		* !	*

Input = /kir'k'i/

e. ☞ kir'k'i			*
f. kir'ik'i		* !	

The input forms discussed so far are short forms, comprising one or two moras. However once longer input forms comprising three or more moras are considered, the role of prosodic constraints in determining epenthesis patterns in Irish becomes apparent.

2.3 *Prosodic constraints on epenthesis*

The prosodic factors that constrain epenthesis are (i) syllable weight and (ii) word-length. As to the first of these, epenthesis occurs in the relevant clusters following a short vowel but not following a long vowel. Examples of forms containing a pre-cluster long vowel are given in (8).

(8) Forms containing a long vowel or diphthong preceding the cluster: no epenthesis

-rm	t'e:rmə	téarma	*term*
-rg	l'e:rgəs	léargas	*insight*
-lg	duəlgəs	dualgas	*duty*

The forms in (8) should be compared with those in (9) (repeated from (2)) in which short vowels precede the (same) clusters and which undergo epenthesis.

(9)

-rm	gorəm	gorm	*blue*
	d'arəməd	dearmad	*mistake*
-rg	d'arəg	dearg	*red*
	ar'ig'əd	airgead	*money*
-lg	s'el'ig'	seilg	*hunt*
	aləgə	alga	*algae*

Turning to word-length, epenthesis does not occur into trisyllabic or longer monomorphemic words of a certain shape, e.g. words containing three light syllables in which the cluster occurs between the first and second syllables.

(10) Trisyllabic words containing the relevant clusters

-rm	s'armənas	searmanas	*sermon*
-r'm'	f'ir'm'imin't'	firmimint	*firmament*
-rb	barbərəx	barbarach	*barbarian*
-lg	skolgərnəx	scolgarnach	*cackle*

The prosodic structure of monomorphemic words is clearly at issue. Note that epenthetic vowels are normally retained in derived forms regardless of prosodic structure; for example, in the related forms ar'i'g'əd *airgead* 'money' ar'i'g'ədəs *airgeadas* 'finance'. (11) and (12) give examples of monomorphemic forms containing the relevant clusters. These examples involve only those clusters where epenthesis can be compelled, e.g. rm, rb, lg etc. They do not involve words containing clusters that appear intact in all prosodic environments, e.g. rk, lp etc.[7]

(11) Forms in which epenthesis occurs[8]
[L = light syllable, H = heavy syllable; the epenthesised syllable is underlined in the output prosodic structure and the epenthesised vowel is underlined in the examples].

	Input prosodic structure	*Output prosodic structure*	*Examples*		
a.	L	L L	gor<u>ə</u>m	gorm	*blue*
			bol<u>ə</u>g	bolg	*stomach*
			tar<u>ə</u>v	tarbh	*bull*
			an'<u>i</u>m'	ainm	*name*
b.	LL	L L L	kar<u>ə</u>bəd	carbad	*chariot*
			tar'<u>i</u>f'ə	tairbhe	*benefit*
			ar'<u>i</u>'g'əd	airgead	money
			dal<u>ə</u>bə	dalba	*bold*
c.	LH	L L H	pur<u>ə</u>go:d'	purgóid	*purgative*
			an'<u>i</u>v'i:	ainmhí	*animal*
			kar<u>ə</u>wa:n	carbhán	*caravan*
d.	LHL	L L H L	s'ar<u>ə</u>vo:ntə	searbhónta	*servant*

[7] It is useful, however, to be aware of parallel examples containing these clusters, e.g. examples in (4) above, korp *corp* 'body' (L), kir'p'əx *coirpeach* 'criminal' (LL) , as well as forms like kar'p'e:d *cairpéad* 'carpet' (LH).

[8] There are exceptions to most of the word-types listed in (11). These are generally relatively recent borrowings from English and could be argued to form a separate sub-lexicon (see e.g. Itô & Mester 1994, 1995 on the structure of the lexicon of Japanese). E.g. exceptions to (11)b: targəd' *targaid* 'target' and pel'v'is *peilbheas* pelvis; to (11)c: hormo:n *hormón* hormone, sir'v'e: *suirbhé* survey and orga:n *orgán* organ; and to (11)d: morga:s't'ə *morgáiste* 'mortgage', norma:ltə *normálta* 'normal' and al'g'e:bər *ailgéabar* 'algebra'.

(12) Forms containing the same cluster types in which epenthesis does **not** occur; the clusters (underlined) remain intact. Note the contrasting cluster location in a and b, and in c and d, which pairs are otherwise prosodically identical.

	Input prosodic structure	*Output prosodic structure*	*Examples*		
a.	L L L[9]	L L L	skolgərnəx fir'm'im'in't' s'armənəs	scolgarnach firmimint searmanas	*cackling* *firmament* *sermon*
b.	L L L	L L L	bambər'n'ə	bambairne	*predicament*
c.	L L H	L L H	purgədo:r' sm'olgəda:n malgəmu:	purgadóir smiolgadán malgamú	*purgatory* *gullet* *amalgamation*
d.	L L H	L L H	kas'ərwa:n	caisearbhán	*dandelion*
e.	L L H L	L L H L	kar'm'il'i:t'əx d'er'm'it'i:t'əs	cairmilíteach deirmitíteas	*carmelite* *dermatitis*
f.	H L	H L	l'e:rgəs ta:r'g'ə	léargas táirge	*insight* *product*

The pattern of epenthesis in the above data can be captured by the following generalisation: epenthesis does not generally occur in words of the structure: [(μ μ) μ ...], that is, epenthesis does not occur in words containing a non-final bimoraic foot at the left edge. This is the prosodic structure of the words in (12) which do not undergo epenthesis. (Foot structure beyond the first foot is ignored).

(13)			
	L L L	(μ μ) μ	(12)a, b
	L L H	(μ μ) μ μ	(12)c, d
	L L H L	(μ μ) μ μ μ	(12)e
	H L	(μ μ) μ	(12)f

Furthermore, the structure [(μ μ) μ ...] is the structure obtained by epenthesis in the examples in (11)b-d. Thus L L and L H (L) (when they contain the relevant clusters) undergo epenthesis to yield L L L and L L H (L), respectively (epenthetic syllable underlined). Compare purəgo:d' *purgóid* 'purgative', (11)c, with purgədo:r' *purgadóir* 'purgatory', (12)c.[10] In the

[9] However, epenthesis applies in s'el'im'id'i *seilmide* 'snail' which suggests that the relevant sonority of the second consonant is relevant here. Note that s'el'id'i (which avoids the cluster altogether) is a common alternant for this form.

[10] Note that the epenthetic vowel in purəgo:d' *purgóid* 'purgative' does not appear in purgədo:r' *purgadóir* 'purgatory'. Recall that derived words normally remain true to their underived sources (cf. ar'i'g'əd *airgead* 'money',

following account, constraints on foot structure in Irish are argued to constrain the emergence of the epenthetic vowel in Irish. The prosodic contraints at issue are Align-L, PARSE-SYLL and NONFINALITY as defined in (14) (e.g. McCarthy & Prince 1993a, b, Prince & Smolensky 1993).

(14) (i) Align-L (Foot, Word): Align the left edge of each foot to the left edge of a word
(ii) PARSESYLL: Syllables are parsed into higher prosodic structure
(iii) NONFINALITY[11]: Feet should not occur in word-final position.

With regard to the first of these constraints, Align-L, it may be noted that stress in the western and northern dialects of Irish falls on the initial syllable - thus left-alignment is justified in this account. Southern Irish dialects, on the other hand, have a more complex stress system where in certain cases stress is attracted by a heavy syllable (see, e.g. Ó Siadhail & Wigger 1975, Ó Siadhail 1989, Ó Sé 1989, Doherty 1991, Gussmann 1995). Arguably, a constraint such as Weight-to-Stress (Prince 1990) compels additional foot-structure in these dialects. As regards the third constraint in (14), NONFINALITY, it is clear from the generalisation that epenthesis does not occur, for example, in words of the structure [(μ μ) μ], that Irish favours only left-aligned non-final feet. As will be illustrated in the following sections, an epenthetic syllable in such forms, if footed, would result in a foot that is not aligned, and if unfooted, would result in an additional violation of PARSESYLL.

2.3.1 *Trimoraic inputs I*

Consider first trimoraic forms which do not undergo epenthesis. In the preliminary account proposed in (15) and (16), the constraints Align-L and PARSESYLL are sufficient.

ar'i'g'ədəs *airgeadas* 'finance'). Since *purgadóir* does not contain an epenthetic vowel, we must conclude that it is behaving as a monomorphemic word.

[11] Non-finality in (14)iii disfavours prosodic structure at the right-edge of a word. Cf. Spaelti 1994:577 for a different formulation of this generalisation: WEAKEDGE (P-Cat): The right periphery of P-Cat [prosodic category] should be empty.

(15) Candidate forms for l'e:rgəs and skolgərnəx:

Input = / le:rgəs /	Align-L	PARSESYLL	*rg	FILL	*rk
a. ☞ (l'e:r) . gəs		*	*		
b. (l'e:) rə . gəs		* * !		*	
c. (l'e:) (rə . gəs)	* !			*	

Input = / skolgərnəx /

d. ☞ (skol . gər) nəx		*	*		
e. (sko . lə) gər . nəx		* * !		*	
f. (sko . lə) (gər . nəx)	* !			*	

As is evident from the tableau in (15), the optimal form given the trimoraic inputs above is determined by the prosodic constraints. Focusing on (15)a-c, a single left-aligned foot is optimal, in spite of the fact that the optimal candidate contains the disfavoured cluster rg. The addition of an epenthetic vowel in order to avoid the offending cluster in (15)b and c, incurs violations of higher ranked constraints: in the case of (15)b the additional unfooted syllable incurs a (second) violation of PARSESYLL, while the additional prosodic (foot) structure in (15)c incurs a violation of Align-L. The ranking arguments involved are as follows:

(16)(i) PARSESYLL >> *rg — (15)a vs. (15)b: better to violate *rg and thus have one less violation of PARSESYLL.

(ii) ALIGN-L >> PARSESYLL — (15)a vs. (15)c: (multiply-)footed trimoraic forms resulting from epenthesis are disfavoured since they inevitably violate Align-L; better to have unparsed syllables

2.3.2 *Bimoraic inputs*

Turning next to (shorter) bimoraic input forms, the above constraints and ranking incorrectly predict a'rg'əd in (17) to be the optimal form:

(17) Candidate forms for ar'ig'əd:

Input = / a'rg'əd /	Align-L	PARSESYLL	*rg	FILL	*rk
a. (a . r'i) . g'əd		*		*	
b. *☞ (a'r . g'əd)			*		

NONFINALITY must therefore be added to the constraint ranking; NONFINALITY, along with Align-L, ensures that the non-final left-aligned foot (achieved by epenthesis) is preferred. In (18), forms containing the clusters r'g' and r'k' are assessed with respect to a more complete constraint hierarchy. In contrast to the trimoraic input forms in (15), prosodic constraints do not determine the optimal forms of bimoraic input forms such as those in (18). Rather, this is done by the lower-ranked cluster constraints. Thus epenthesis is compelled in ar'ig'əd by *rg, while the relative ranking of FILL with respect to *rk prevents epenthesis in kir'k'i .

(18) Candidate forms for ar'ig'əd and kir'k'i:

	ALIGN-L	NONFIN	PARSESYLL	*rg	FILL	*rk
a. ☞ (a . r'i) . g'əd			*		*	
b. (a'r . g'əd)		*		* !		
c. ☞ (kir' . k'i)		*				*
d. (ki . r'i) . k'i			*		* !	

NONFIN and PARSESYLL cannot be ranked. Comparing (18)a and b with (18)c and d, it is evident that neither ranking of NONFIN and PARSESYLL would yield the desired output for both candidate sets. However, once these constraints are unranked, the decision is passed on to lower-ranked constraints, here the cluster constraints and FILL, and the right result is achieved. The emergent pattern is therefore the following: epenthesis is compelled by the cluster constraints except where a form is of certain prosodic complexity and the addition of an epenthetic vowel/syllable would lead to violation of prosodic constraints. However, epenthesis **cannot** be viewed as driven by prosodic requirements (i.e. to yield a non-final foot), since we would not expect such prosodic requirements to be sensitive to cluster type (rg vs rk, for example); nor would we expect the absence of ranking in the case of NONFIN and PARSESYLL as argued for above.

2.3.2 *Trimoraic inputs II*

In order to complete the account proposed with respect to trimoraic input forms, (19) contains the candidate forms considered earlier in (15), but evaluated with respect to the more complete constraint hierarchy. As in (15), the optimal candidate is determined by the higher-ranked prosodic constraints. (20) contains candidate forms which have the same prosodic shape as those in (19) (HL) but which contain the non-epenthesising r'k' cluster, ❄☺❋❒☺✻☺❇ *déirce* 'alms/charity'.

(19) Candidate forms for l'e:rgəs and skolgə❒■əx:

	Align-L	NONFIN	PARSESYLL	*rg	FILL	*rk
a. ☞(l'e:r) . gəs			*	*		
b. (l'e:) rə . gəs			* * !		*	
c. (l'e:) (rə . gəs)	* !	*			*	
d. ☞(skol . gər) nəx			*	*		
e. (sko . lə) gər . nəx			* * !		*	
f. (sko . lə) (gər. nəx)	* !	*			*	

(20) Candidate forms for d'e:r'ki

	Align-L	NONFIN	PARSESYLL	*rg	FILL	*rk
a. ☞ (d'e:r') . k'i			*			*
b. (d'e:) r'i . k'i			* * !		*	
c. (d'e:) (r'i . k'i)	* !	*			*	

The cluster constraints play no role in determining the optimal form in (19) and (20) above. This is, of course, also the case in longer prosodic words, for example kar'm'il'i:t'əx *cairmilíteach* 'carmelite' in (21).

(21) Sample candidate forms for k'ar'm'il'i:t'əx:[12]

	Align-L	NONFIN	PARSESYLL	*rg	FILL	*rk
a. ☞ (kar'm'i) l'i: t'əx			* *	*		
b. (kar'm'i) (l'i:) t'əx	* !		*	*		
c. (kar'i) m'i (l'i:) t'əx	* !		* *		*	

2.3.4 *Monomoraic inputs*

Shorter input forms (containing one mora) are considered in (22). As expected, the optimal candidate is determined by the lower-ranked cluster constraints.

[12] In the southern dialects where stress shifts rightwards in certain cases to a heavy syllable, the additional foot in (20)b. would be required. Weight-to-Stress would outrank Align-L in these dialects, thus eliminating (20)a. from consideration. (20)b. would then be the optimal candidate.

(22) Candidate forms for d'arəg and k'ark:

	Align-L	NONFIN	PARSESYLL	*rg	FILL	*rk
a. ☞ (d'a . rəg)		*			*	
b. (d'arg)		*		*!		
c. (d'a . rə) gə			*		**!	
d. ☞ (k'ark)		*				*
e. (k'a . rək)		*			*!	
f. (k'a . rə) kə			*		*!*	

The shorter prosodic forms in (22), whether faithfully parsed or containing one or two epenthetic vowel, yield a single foot, thus satisfying Align-L. (22)a and b and (22) d and e are fully parsed into this single foot, thus satisfying PARSESYLL but violating NONFIN. The forms in (22)c and f, on the other hand, contain an additional epenthetic vowel, thus avoiding a violation of NONFIN, but incurring instead a violation of PARSESYLL. However, since NONFIN and PARSESYLL are crucially unranked (see e.g. (18)), all given candidates in (22) tie with respect to the prosodic constraints. The decision is therefore passed to the lower-ranked cluster constraints and the contrasting effects of the different clusters reemerge.

2.3.5 *Further issues: inputs containing homorganic clusters*

Finally, for completeness, though offering no formal solution, I return to forms that contain a homorganic cluster. The examples given in (3) and (5) are repeated in (23).

(23)					
	-rn	a.	dorən	dorn	*fist*
			karən	carn	*mound*
		b.	karna:n/ka:rna:n	carnán	*mound*
			darnə/da:rnə	darna	*second*
	-rl	c.	aurla:r (C) u:rla:r (M) urlar (D)	urlár	*floor*

Homorganic clusters clearly resist epenthesis, the linked place specification exhibiting geminate integrity effects (see e.g. Itô 1989). This generally holds both word-internally and word-finally, with the exception of word-final -rn, as seen in (23)a. Disregarding sonorant-voiceless consonant clusters, the other coronal clusters include -rd, -rl and -ld. It may be noted that vowels preceding -rd are invariably long, and that -rl and -ld occur only word-internally. The exceptional behaviour of word-final -rn (i.e. requiring epenthesis) could be attributed to the relative sonority of the

second member of the cluster: rd# contrasts with rn# in that the final nasal can assert its syllabicity in spite of the linked structure.[13]

3. Conclusion

The pattern of epenthesis in Irish discussed reveals an interesting interaction between prosodic and segmental constraints. The former outrank the latter as evidenced by the behaviour of relatively longer inputs where satisfaction of prosodic constraints determines the optimal form regardless of whether that form contains a disfavoured cluster. The same prosodic constraints, however, do not determine the optimal candidate for shorter (mono- or bimoraic) inputs - rather the lower-ranked cluster constraints do.

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[13] Recall footnote 7, where s'el'im'id'i *seilmide* 'snail' undergoes epenthesis although its prosodic structure is such that epenthesis should not be optimal.

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