Faroese Glide Insertion

An OT Account of [v] Epenthesis

Nicholas LaCara
nlacara@ucsc.edu
Phonology A, Fall 2008

December 9, 2008

1 Introduction

1.1 Background

Faroese is an insular Scandinavian language spoken by approximately 50,000 people in the Faroe Islands (Þráinsson, *et al.* 2004). Like many languages, Faroese has a process for avoiding vowel hiatuses, typically labeled "glide insertion" in the literature (Anderson 1969, Þráinsson, *et al.* 2004). The process is descriptively generalized in the previous sources in the following ways (based on Þráinsson, *et al.* 2004):

(1) a. If the first vowel is a high front vowel, the glide inserted will be [j].
b. If the first vowel is a high back vowel, the glide inserted will be [w].
c. If the first vowel is non-high, [j] is inserted before a /i/ and [v] before a /u/.
d. No glide is inserted after non-high vowels before an /a/.

The generalizations above can be further distilled to a more general statement that an inserted glide must share features with the high vowels around it if such a vowel is present.

Anderson (1969) spends some time discussing these generalizations in a feature and rule based system. Under such a system it is fairly easy to specify the changes involved–individual rules change the relevant and necessary features allowing for the proper surface forms to be output by the phonology. However, under the constraint based system of Optimality Theory (Prince and Smolensky 1993), the motivation for the epenthesis becomes central to the explanation of glide insertion. Beyond this, the quality and form of the epenthesized consonants themselves must be motivated.

This introduces a number of problems into the analysis that were not present in rule based accounts. A central question here is what motivates the insertion of the fricative [v] after [-high] vowels as opposed to the approximant [w]. In order to deal with this, we need to address the issue of which glide is inserted in the normal cases. In a rule based system, this can accounted for with rule ordering.

I shall propose an analysis based largely on recent work on glide insertion and intrusive *r* in English (Uffmann 2007, Ito & Mester 2007, Baković 1999). This analysis will rely primarily on the notion of feature spreading. I will adopt Uffmann's (2007) use of a sonority-based hierarchy to account for the quality of the inserted segments. However, this analysis, while useful for explaining English intrusive *r*, entails a number of problems when applied to Faroese. It predicts that we should see more sonorous segments than [v] inserted, which does not happen. In order to arrive at the proper output, we have to appeal to a number of extra constraints that restrict the epenthesized segment to sonorities less than [v], but at the same time permit [w] and [j] to be in the output where necessary. The constraints can be further applied to blocking epenthesis in the cases where it should not happen. However, the sheer amount of additional machinery required to make the hierarchy work in Faroese should ultimately make us question its utility as a whole.

1.2 Data

The primary sources of data in this paper come from Þráinsson, *et al*, 2004 and Anderson 1969. The notation from Anderson's thesis has been regularized to match the more up-to-date transcriptions in recent work.

siga	[si:ja]	'say'	*kvæði*	[kvɛa:jɪ]	'ballad'
siður	[si:jʊɹ]	'custom'	*maður*	[mɛa:vʊr]	'man'
suði	[su:wɪ]	'whistling'	*gleða*	[gle:a]	'please'
gleði	[gleːji]	'pleasure'			

The examples above are meant to be exemplary, not exhaustive. As can be seen, glide epenthesis happens both word-internally and across morpheme boundaries. The quality of a glide can be predicted based entirely upon the quality of the surrounding vowels.

It is also worth noting that there is no /w/ phoneme in Faroese, though there is a /j/ (Þráinsson, *et al*, 2004). The phone [w] only occurs in the intervocalic environments described above.

1.3 A Note on Orthography and History

In the data presented above, one can notice that in many of the places that we observe glide insertion we also see the letter <ð> or <g> in the orthography. It is worth noting now that the Faroese alphabet is "consciously archaic" and not very phonetic (Anderson 1969). The current alphabet was developed in the mid-1800's by Vensil Ulrik Hammershaimb (Rudholm 2002), who intentionally made his alphabet reflective of Old Norse and Icelandic (Anderson 1969). As Rudholm (2002) writes, "han gick tillbaka till fornspråket och lät det ligga till grund för det nya skriftspråket"[1]. The result is that the written language is "both etymological and morphophonemic in nature" (Þráinsson, *et al.* 2004).

The occurrence of <ð> is one such feature, as is the occurrence of intervocalic <g>, neither of which has a particular phoneme associated with it (Anderson 1969). At some point in the language's history, the intervocalic velar fricative and dental fricative that these graphemes represented merged and were eventually deleted entirely (Anderson 1969). The result of this loss is that the vowels they once separated are now adjacent, feeding the glide insertion.

2 English Glide Insertion

English has a glide insertion that is similar in many ways to what we see in Faroese. In English, glides are often inserted after high vowels and, in some dialects, after [–high] vowels. In this section I review the facts and recent OT analyses of this phenomenon and show that we might want to adopt it to account for Faroese glide insertion as well.

2.1 Previous Analyses

The basic fact is that in English glide insertion happens after high vowels. The following examples are emblematic of the phenomenon (from Gimsom and Cruttenden 2001, cited in Ito and Mester 2007):

my arms	[maɪ ^{j}ɑ:ms]
you aren't	[ju: ^{w}ɑ:nt]

In non-rhotic accents, [ɹ] is epenthesized after low vowels:

saw Ann	[sɔ: ræn]

[1] "He went back to the old language and let it lay the ground for the new orthography" (my translation)

The way a number of analyses proceed to account for this epenthesis is by inserting a root node (i.e. C) in between the vowels and spreading features from the surrounding vowels onto that node (Uffmann 2007 and Ito and Mester 2007). This can be compared to an analysis like that of Baković (1999), which relies on diphthongization of vowels to account for the epenthesis. I follow the former analysis here. The reason is that Baković's analysis seems only to work within the context of McCarthy's (1993) FINAL-C constraint, which state that all prosodic words must end in a consonant. Diphthongization of a word-final vowel allows for the newly inserted segment to fulfill FINAL-C. However, glide insertion in Faroese happens within the prosodic word, and McCarthy's analysis has a number of problematic features regardless (Ito and Mester 2007). Moreover, it's unclear that diphthongization of a word-initial consonant could fulfill FINAL-C, as one might predict that it should be more likely to fulfill ONSET. This might explain why in English the diphthongization happens only to the right of high vowels–diphthongization can only result in a final coda epenthesis–but Faroese clearly has insertions to the right and left of high vowels. Spreading of features to an empty node seems to be the superiour analysis.

2.2 Uffman's (2007) Analysis

It is the primary goal of Uffmann (2007) to explain how [ɹ] could possibly be the most optimal epenthesis in the dialects that permit it. He links this phenomenon to normal glide insertion in English, which he argues is a way of enforcing ONSET in English (c.f. McCarthy 1993 and his FINAL-C constraint). As [*r] is a particularly sonorous segment, Uffmann develops a constraint hierarchy based on Prince and Smolensky's (1993) theory of Prominence Alignment to predict what segment is epenthesized. This hierarchy is based on sonority because, as Uffmann claims, the most sonorant segment possible should be epenthesized because they "minimise prominence contrast".

The hierarchy Uffmann introduces is designed to cover the facts of English:

(2) *V_V/lar ≫ *V_V/obs ≫ *V_V/nas ≫ *V_V/l ≫ *V_V/r ≫ *V_V/V

Each constraint is a markedness constraint against certain consonant types occurring between vowels. They delimit the epenthesization that is driven by ONSET. The following tableau for the string *law is* exemplifies how this works (from Uffmann 2007)[2]:

/lɔː ɪz/		ONSET	*$G_{[-hi]}$	DEP(hi)	DEP	*V_V/lar	*V_V/r	*V_V/V
a.	[lɔːɪz]	*!						
b.	[lɔwɪz]			*!	*			*
c.	[lɔʏɪz]		*!		*			*
d. ☞	[lɔrɪz]				*		*	
e.	[lɔʔɪz]				*	*!		

Table 1: A tableau showing Uffmann's (condensed) analysis.

A couple of his constraints warrant a brief explanation:

- *$G_{[-hi]}$: No [–high] glides.
- DEP(hi): The feature [high] must have a correspondent in the input. This prevents insertion of [high] features to rescue the derivation.

[2]Note that there are no candidates involving deletion. Deletion is not a strategy used in English to avoid hiatus (nor is it in Faroese), so it is left undiscussed. I take as implicit in Uffmann's argument an undominated MAX constraint, and I will assume it throughout the remainder of this paper.

2.3 Faroese?

Uffmann's analysis accounts for the English data pretty well, and as such we should consider adopting it as the basis for Faroese glide insertion as well. The main reasoning behind this is that the languages show a number of similarities, and we should want to capture the intuition that the phenomenon is largely the same. In both languages, glide insertion happens as a way to break up hiatus, and there is an intersection in the sets of segments that are epenthesized. Consequently, it makes sense in the spirit of Universal Grammar to adopt the same analysis for both languages.

This does not, of course, mean that we should adopt the full analysis outright. Obviously, the facts of Faroese glide insertion are notably different than those of English, and any decent analysis will need to account for these differences. Below I attempt show how Uffmann's analysis could be extended to account for the different facts in Faroese glide insertion[3]

3 Extending the Analysis

As the following tableau shows, we can use Uffmann's analysis to explain at least a subset of the Faroese facts:

/si: + a/		Onset	*G[-HI]	Dep(hi)	DEP	*V_V/lar	*V_V/Obs	*V_V/Liq	*V_V/V
a.	[si:a]	*!							
b. ☞	[si:ja]				*				*
c.	[si:ra]				*			*!	
d.	[si:ʃa]				*		*!		
e.	[si:ʔa]				*	*!			

Table 2: *Siga* under Uffman's analysis

This is a good start, but it can't account for all of the data. We have at least three problems that we need to address in order to make the analysis fully account for the Faroese data:

- **Directionality**: The epenthesized glide must share features with an adjacent high vowel, but when the glide is between two high vowels, then it agrees with the one to the left. In other words, spreading prefers to be rightward.
- **Quality**: The epenthesized "glide" isn't always a glide. As words like *maður* show, [v] is epenthesized after [–high] vowels preceding [+high, +back] vowels, but with the assumed constraint hierarchy we might predict a more sonorous epenthetic segment.
- **Unresolved Hiatuses**: When there are no high vowels, hiatuses are left unresolved.

In the following sections I address these two issues. First I turn to the problem of directionality, and suggest a constraint against leftward movement. Afterward, I look at the somewhat more troubling problem of [v] insertion.

3.1 Directionality

One issue facing a full analysis of glide insertion in Faroese is the fact that the glide can take on the quality of a high vowel regardless of whether that vowel is the first or second vowel in the sequence. That is to say, features can spread onto an epenthesized C node from either the left or the right. Uffmann's analysis says nothing (internally) about the direction of feature spreading, primarily because in English the direction is

[3]In adopting Uffmann's (2007) analysis here, I subsume a number of his assumptions and arguments. Due to limitations in space, I do not discuss all of them, but take them as implicit.

always rightward. This is a problem for Faroese, as the following examples show:

kvæði	[kvɛa:.jɪ]	*[kvɛa:.ɪ]
siður	[si:.jʊɹ]	*[si:.wʊɹ]

Words like *kvæði* require spreading of features leftward in order to have the proper output form. However, leftward spreading of features is not always permitted. As in the word *siður*, spreading must be rightward whenever possible. Uffman's analysis cannot capture this:

/si: + ur/		Onset	*G[-HI]	Dep(hi)	DEP	*V_V/lar	*V_V/Obs	*V_V/Liq	*V_V/V
a.	[si:ʊr]	*!							
b. :-(	[si:jʊr]				*				*
c. ✖	[si:wʊr]				*				*

Table 3: *Siður* in Uffman's analysis

This is not merely an issue of quality, where the language prefers to insert [j] over [w]. As Tableau 4 shows, the same issue of directionality happens in words like *suði*:

/su: + i/		Onset	*G[-HI]	Dep(hi)	DEP	*V_V/lar	*V_V/Obs	*V_V/Liq	*V_V/V
a.	[su:i]	*!							
b. :-(	[su:wɪ]				*				*
c. ✖	[su:jɪ]				*				*

Table 4: *Suði* under Uffman's analysis

As the tableau 3 demonstrate, the current ranking predicts that both [si:jʊɹ] and *[si:wʊɹ] are equally optimal, but this is not the case. We need to constrain the output to only allow spreading from the first vowel, but not from the second.

In order to capture the facts above, we need to assume some sort of constraint against leftward movement. I propose such a constraint, which I name *Spread-L. Motivation for such a constraint is cross-linguistic: Uffmann footnotes that English and Dutch have fixed rightward spreading (though he says nothing about this in his analysis), and David Teeple (cited in Ito and Mester 2007) also notes that there is a crosslinguistic tendency for features not to spread leftward. In English this is likely a highly ranked (perhaps inviolable) constraint, which explains why the feature spreading we observe is always to the right and never to the left. In Faroese, however, it needs to be lower-ranking, allowing it to be violated. This allows us to account for the data:

/si: + ʊɹ/		Onset	Dep	*Spread-L
a.	siː.ʊɹ	*!		
b.	siː.wʊɹ		*	*!
c. ☞	siː.jʊɹ		*	

Table 5: Spread-L and *siður*

The introduction of this constraint prevents spreading of the features from the right vowel, ensuring that [si:jʊɹ] is more optimal than [si:wʊɹ]. However, because it is lower in the ranking it permits leftward spreading when required, as shown in Tableau 6.

The relative low ranking of *Spread-L means that the spreading of features from [i] here is permissible. The higher ranked $*G_{[-hi]}$ ensures that rightward spreading from [a] cannot happen, as the resulting glide would be [–high].

I might add here that it has been suggested to me that this directionality might be attributable to OCP effects, but it's not clear that this is a viable way to analyze the observed phenomenon. The OCP states that "adjacent identical elements are prohibited" (Meyers 1997), which in OT translates as a constraint

/kvɛaː + ɪ/		Onset	*G[-hi]	Dep	*Spread-L
a.	kvɛaːɪ	*!			
b. ☞	kvɛaːjɪ			*	*
c.	kvɛaːʔɪ		*!	*	

Table 6: Spread-L is violated by *kvæði*.

favoring multiple linking. The feature spreading that *Spread-L means to constrain is itself a form of multiple linking, so a constraint favoring such a relationship should not prevent linking in either direction.

3.2 [v] Insertion

As we've seen already, Faroese is unusual in that in specific cases it epenthesizes [v] rather than [w] after high vowels. This can be seen in words like the following:

maður [mɛaː.vʊɹ] *[mɛaː.wʊɹ]

This fact is particularly problematic under our current analysis. The constraint hierarchy we have assumed does not immediately predict that [v] should be inserted; in fact, it is one of the least likely candidates under this analysis.

3.2.1 On the [w] ~ [v] Alternation

The [w] ~ [v] alternation in Faroese occurs under somewhat specific conditions. Anderson (1969) asserts that "w̲ becomes v̲ in all positions except after a [+high] vowel." Under his analysis, the predicted [w] is inserted in the phonological derivation, and afterward a separate rule comes in and changes [w] to [v] anytime it is found after a [–high] vowel. This is a simple process of changing features.

3.2.2 Glide-Consonant Alternations

Returning to the epenthesis, the appearance of [v] as opposed to [w] still appears to be spreading. Both segments are labials. The alternation of glides and fricatives is not altogether unusual. Synchronically, some dialects of Spanish alternate the palatal glide [j] with the postalveolar fricative [ʒ], particularly the Porteño dialect of Argentina described by Harris and Kaisse (1999).

Across languages, we can observe similar [w]>[v]. For instance, the reflex of English [w] is [v] in many other Germanic languages (i.e. German *wasser* [vasɐ], Swedish *vatten* [vatːɛn], but English *water* [wɑɾəˠ]).

The fact of the matter is that alternations of the type observed in Faroese are not unheard of. The problem is that the domain of this alternation–only after [–high] vowels–is particularly constrained. We might conclude that there is some sort of constraint against [w] following a [-high] vowel. The [v] simply needs to be the next optimal segment.

A constraint of the type implied may get us somewhere, but it is not sufficient enough to guarantee the correct output. Such a constraint would not guarantee a [v] over a [w] at output; rather, we might expect some other more sonorous segment, in keeping with the hierarchy. Tableau 7 illustrates the problem. In this ranking, the incorrect output *[mɛamʊɹ] is selected, but what we really want is [mɛavʊɹ].

/mɛa + ur/		Onset	*wV[-hi]	*V_V/lar	*V_V/Obs	*V_V/Nas	*V_V/V
a.	meauɹ	*!					
b.	mɛavʊɹ				*!		
c. *	mɛamʊɹ					*	
d.	mɛawʊɹ		*!				*

Table 7: *Maður* fails.

How can we account for this? Every potential segment of greater sonority than [v] (i.e. [m] and [ʊ][4]) must be blocked from selection without stopping spreading before high front vowels (i.e., in *kvæði.*) This means that we can't simply say that there is a constraint like *V_V/Son which marks sonorants between vowels. Besides, it would have to be ranked higher than *V_V/Obs, and this wouldn't be in very good keeping with our hierarchy or Pāṇini's Theorem (Prince and Smolensky 1993). The constraint would have to be specific enough to target sonorant segments like [w], [ʊ], and [m], but crucially allow [j] and [v]. Whatever we propose, it seems that the rule will necessarily target labial sonorants specifically, as we have done above.

3.2.3 Featural Faithfulness

One potential way of preventing the apparent insertion of [m] or [ʊ] is to introduce some sort of featural faithfulness constraints (introduced briefly in McCarthy and Prince 1995). In our feature spreading analysis, we have specified that place features are spreading from a vowel to an adjacent root node. Crucially, the place features do not include manner features such as [nasal]. This means that for any epenthesized consonant to be nasal, as we predicted they should be in the tableau above, a nasal feature must be inserted as well.

An insertion of a [nasal] feature (and, certainly, any features that result in liquids) would introduce material that was not in the input, and this in some sense should be costly to the derivation. This follows from the facts themselves: Faroese never inserts nasals or liquids to resolve hiatus. This implies constraints penalizing the insertion of relevant features into the derivation. For this, I introduce the DEP(F) family of constraints[5]:

DEP(F) Let F be some feature in the output. Every occurrence of the feature F must have a correspondent in the input.

Particularly, we need the constraints DEP(Nas) and DEP(Liq)[6] to ensure against the epenthesis of [m] or [ʊ]. These constraints must be crucially ranked above Uffmann's hierarchy if they are to have the desired effect, though they are not crucially ranked themselves. Notably, they are of the same class as Uffmann's DEP(hi) constraint, which he introduces to prevent the insertion of [high] features to make acceptable glides.

/mɛa + ur/		ONSET	DEP	*w͡V$_{[-hi]}$	DEP(N)	DEP(L)	*V_V/Obs	*V_V/N	*V_V/L	*V_V/V
a.	mɛa.ʊr	*!								
b. ☞	mɛa.vʊr		*				*			
c.	mɛa.wʊr		*	*!						*
d.	mɛa.mʊr		*		*!			*		
e.	mea.ʊʊr		*			*!			*	

Table 8: DEP(F) constraints predict the proper output for *maður.*

The desired output is obtained with the additional faithfulness constraints. These constraints do not interact with the epenthesis of glides because glides are neither liquids nor nasal, so they do not affect the other epenthesis in any way.

[4] I use [ʊ] here to indicate some sort of labial glide, not necessarily the labiodental approximant.

[5] McCarthy and Prince (1995) introduce this as a logical extension of their theory of correspondence between segments. They suggest that it could replace the more ubiquitous constraint IDENT(F). I don't use IDENT(F]) here on the basis that it seems to require that the feature it specifies be attached to some input segment. Clearly, the epenthesized segment has no input correspondent, so it is unclear that IDENT(F) could be of any utility here.

[6] This constraint may not necessarily be featural, as there is no feature [Liquid] in the theories with which I am familiar. This constraint may better be described as a constraint against having any segment that is a member of the class liquids in the output that does not have a correspondent liquid in the input.

3.3 Unresolved Hiatuses

The last thing that our analysis needs to account for is the fact that hiatus is not always resolved in Faroese. Several words, such as *gleða* [glɛːa], violate onset. Given that ONSET has been the highest ranked constraint in our hierarchy all along, it stands to say that we need to reconsider the ranking. It seems fair to claim that the process of glide epenthesis is motivated by ONSET, so it must be ranked relatively high. At the same time, it must be ranked in a way so as to be violated some times, or outputs like [glɛːa] could not be permissible.

As I mentioned in 3.2.3, Faroese never inserts nasals or liquids to resolve hiatus, and this is in part motivates the introduction of the featural faithfulness constraints. This being the case, the relevant DEP constraints ought to be ranked above ONSET. If they were not, we would predict that nasals or liquids or any other segment might get epenthesized. Ranking them above ONSET ensures that they will never be inserted to resolve hiatus. Uffmann's (2007) DEP(hi) constraint should be here too, otherwise we would predict that the epenthesis of a high feature would be better than allowing a hiatus between non-high vowels.

This still requires us to explain why fricatives aren't inserted. As the epenthesized segment would receive its place features from one of the surrounding vowels, we would have to assume that in this case the epenthesized consonant would be [-high] in specification. It seems, though, that Faroese does not have any [-high] consonants[7]. Since such consonants are marked in language, never surfacing, it would be fair to assume an undominated constraint against [-high] consonants. Provided this, we can predict when hiatuses will be permitted. Tableau 9 shows this (Uffmann's hierarchy follows ONSET like we've been assuming so far):

/gleː+a/		*C$_{[-hi]}$	DEP(Hi)	DEP(Liq)	DEP(Nas)	ONS
a.	☞ gleːa					*
b.	gleːja		*!			
c.	gleːra			*!		
d.	gleːna				*!	
e.	gleːʔa	*!				

Table 9: Hiatus permitted with DEP constraints

Crucially, this ranking permits glides and (non-high) fricatives. Tableau 10 demonstrates this clearly. Both [w] and [v] are permissible epenthetic segments by this ranking. The two segments are evaluated by lower ranking hierarchy, which will in turn predict the correct form [mɛaːvʊr] (as in Table 8).

/mɛaː + ur/		*C[-HI]	DEP(HI)	DEP(LIQ)	DEP(NAS)	ONS
a.	mɛaːʊr					*!
b.	☞ mɛaːwʊr					
c.	mɛaːvʊr			*!		
d.	mɛaːmʊr				*!	
e.	☞ mɛaːvʊr					

Table 10: Glides and Fricatives allowed.

4 Conclusion

Faroese glide insertion can be accounted for under Optimality Theory in a way consistent with analyses of glide insertion in English (Uffmann 2007, Itô and Mester 2007), though not without some work. In order to account for directionality of feature spreading, we must introduce a constraint that penalizes spreading

[7] The only two velar consonants in Faroese are /k/ and /g̊/. I am assuming that they are either [+high] or underspecified for [high].

leftward, positioning it in the ranking low enough that it can be violated where necessary. Accounting for the epenthesized [v] is a bit trickier, forcing us to stipulate a constraint blocking the predicted insertion of [w] after [–high] vowels. Provided this, the addition of featural faithfulness constraints, particularly of the family DEP(F), allow for the correct output to be predicted. We can rank these constraints over ONSET in order to predict when glide insertion will not occur.

However, the addition of all of this extra technology should really make us question whether the hierarchy set out by Uffmann (2007) is really the best solution to the problem of glide insertion as a whole. Little of it is ever used productively. The hierarchy seems to have limited application at best, and there may be a better way to predict the outputs that are observed in Faroese. It could be beneficial to investigate possible analyses of glide insertion without appealing to the hierarchy. Working from there, the analysis could then be turned back to English to see if there is any possible application in that direction.

It is also worth noting that some nasals and liquids of the language undergo alternations elsewhere; for instance, the sequence /nn/ surfaces as [n̥n] consistently in native Faroese words, and similar phenomena occur with /l/ and /r/ sequences (Þráinsson, *et al* 2004). These very same kinds of segments are the ones that are skipped in the hierarchical analysis, and there may be some sort of connection between the faithfulness constraints that might be involved here and those that we observe in the analysis of glide insertion.

Finally, Þráinsson, *et al* (2004) note that this process is no longer fully productive. As they put it, "analogical insertion of [v] between a non-high vowel and /a/ is not uncommon if other forms of the word have [v] before /u/ [...] The analogical levelling can be interpreted as a sign indicating that the glide insertion is not completely productive or automatic anymore." An analysis of this change, perhaps under the framework of transderivational identity (Benua 1997), could prove interesting, perhaps shedding more light on the phenomena as a whole.

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