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Liquid Dissimilation in Bavarian German

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The present study investigates the instability of adjacent liquids in a variety of Southern Bavarian German. The focus is a synchronic process converting /r/ to [d] before or after /l/—a process argued to involve a dissimilation of the phonological feature [liquid], which itself is triggered by a specific OCP constraint, *[liquid][liquid]. In addition to providing evidence for the feature [liquid], the present article also supports a model of segment structure in which the traditional feature [sonorant] is replaced with the privative node [Sonorant Voice] (SV). The Bavarian dialect also displays a number of OCP-motivated constraints that ban other sequences of identical manner features, namely, [continuant], [nasal], [strident].*

1. Introduction.

In a regional variety of Southern Bavarian German described by Schatz (1897), a regular synchronic process converts /r/ into [d] before /l/, as in 1.

(1) /r/ becomes [d] before /l/

a. Tier	/tiər/	[tiər]	‘animal’
b. Tierlein	/tiər-lə/	[tiədlə]	‘animal (dim.)’

Similar examples show that the same dialect applies the mirror-image process to /r/ after /l/. A related set of phenomena reveals that the dialect also invokes various avoidance strategies for adjacent identical liquids; that is, input heteromorphemic sequences such as /l-l/ do not surface as such.

Three natural questions pertaining to the example in 1b are: (i) why does the /r/ change before /l/ and not before other sounds?; (ii) why does

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/r/ surface as [d] and not as some other sound?; and (iii) why does the /r/ in the input sequence change and not the /l/?

In this article, I present a formal analysis of examples of the type in 1 that answers questions (i)–(iii). I argue that /r/ changes before /l/ and not before other sounds (that is, (i)) because all and only liquids (that is, /l/ and /r/) bear the feature [liquid] and that a feature-specific OCP constraint banning adjacent liquids is active. The change in 1b is therefore argued to involve a dissimilation of the feature [liquid]—a process I analyze as a delinking of [liquid] when adjacent to the same feature. I also show that the output of the change in 1b is [d] and not some other sound (that is, (ii)) given an approach in which the traditional feature [sonorant] is replaced with the (privative) node [SV] ("Sonorant Voice;" see, for example, Rice 1993). Segments bearing SV include traditional sonorants like /n l r/, as well as obstruents that behave phonologically like sonorants, for example, /d/. Given this approach, the change from /r/ to [d] is argued to be a natural change. I argue further that the fact that /r/ and not /l/ changes (that is, (iii)) follows from the principle of Structure Preservation (for example, Kiparsky 1985), which has been claimed by several linguists to hold in general for all dissimilatory processes.

The present analysis is important for several reasons. First, it provides an explanation for a regular synchronic process that appears to be rare both within and outside of Germanic. Second, it furnishes evidence for the feature [liquid] (proposed by Dixon 1972 and Walsh Dickey 1997 on independent grounds) and for the [SV] model developed by Rice (1993) and other authors. Third, the analysis contributes to our understanding of dissimilations in general and to the treatment of dissimilations as processes deleting a feature [F] when adjacent to the same feature in order to repair a specific OCP constraint *[F] [F]; see Yip 1988, Cohn 1992, and Hall 2008. (The reader is also referred to the work done in Optimality Theory (OT) on dissimilations; see below).

As discussed below, this Bavarian dialect also avoids sequences of other adjacent manner features, for example, [continuant], [nasal], and [strident]. The evidence comes primarily from the realm of phonotactics, that is, morpheme structure constraints. The conclusion is that the avoidance of identical feature specifications (that is, the OCP constraint *[F][F]) in the Bavarian dialect in 1 is restricted to manner features.

The present article is structured as follows. In section 2, I present a brief discussion of the phonetics of the Bavarian German consonants as

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described by Schatz (1897) and Hathaway (1979). Distinctive features for this dialect are proposed in section 3. In that section I also discuss the cross-linguistic motivation for the features [liquid] and [SV] referred to above. In section 4, I discuss the approach to dissimilations adopted in the present analysis. This discussion includes a short summary of the cross-linguistic properties of dissimilations and a formal account of dissimilations as the deletion of a feature [F] as a response to an OCP constraint *[F][F]. In section 5, I present a larger data set from Bavarian German illustrating the instability of adjacent non-identical liquids as in 1 as well as adjacent identical liquids and present my analysis thereof. In section 6, I discuss the status of the feature-specific OCP constraints for other manner features. There I present a case study from the history of the Bavarian dialect involving the dissimilation of the feature [continuant] and a discussion of the avoidance of adjacent nasals and strident sounds. Section 7 concludes.

2. Background on Imst German Consonants.

The present article concerns itself with a particular regional variety of Southern Bavarian German spoken in Imst, Austria (65 km west of Innsbruck). This dialect is henceforth referred to as Imst German (IG). The data presented below are drawn from the 1897 grammar of Joseph Schatz. A larger corpus with material from this dialect as well as other regional varieties of German spoken in the Tyrolian region is contained in Schatz 1955. The reader is also referred to Hathaway (1979), who analyzed the dialect of Imst approximately eighty years after Schatz's original grammar.

In his description of IG consonants, Schatz (1897:6–9, and elsewhere) and Hathaway (1979) list the sounds in 2, which I have divided into obstruents (2a) and sonorants (2b). I analyze all consonants in 2 as phonemic.[1]

[1] In addition to the sounds in 2, Schatz also has the two glides [w j], which I assume to be featurally identical with the corresponding high vowels /u i/. I speculate here that the former are derived from the latter if [u i] stand in complementary distribution with [w j]. Imst German also has regular alternations between [b] and [w], which I comment on briefly in note 14 below. I classify /h/ in 2a arbitrarily as an obstruent and not as a sonorant.

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(2) IG consonants

a.	VC STOPS	p	t		k	
	VD STOPS	b	d		g	
	AFFRICATES	pf	ts	tʃ	kx	
	FRICATIVES	f	s	ʃ	x	h

b.	NASALS	m	n		ŋ
	LIQUIDS		l r		

Among the obstruents in 2a, there is what I refer to here as a "voicing" contrast involving only stops, that is, voiceless (VC) /p t k/ contrast with voiced (VD) /b d g/. In contrast to other varieties of German, Imst German has only voiceless fricatives. All affricates in 2a are voiceless and all sonorants in 2b are voiced.

The focus in the present paper is on the two liquids in 2b, namely, /l/ and /r/. The former is an alveolar lateral (IPA [l]), while the latter is a uvular sound produced with vibrating vocal cords (IPA [ʀ]). Both /l/ and /r/ can occur word initially, medially, and finally. It is clear from the discussion of /r/ in Schatz 1897:93 that Imst German does not have a process of *r*-vocalization as in other varieties of German; hence, in Imst German coda /r/ surfaces as a uvular trill and not as the vocalized sound [ɐ].

In addition to /l/ and /r/, Imst German has two geminate liquids on the surface, namely [ll] and [rr]. I follow Hathaway (1979:31) (who relies on the observations of Schatz 1897:24) in treating these sounds as allophones of /l/ and /r/ respectively because the geminates [ll] and [rr] have a predictable distribution: /ll/ and /rr/ only surface only after short stressed vowels. I discuss the representation of geminate liquids in section 5.3.

3. The Features for Imst German.

In section 3.1, I posit the distinctive features for Imst German. Section 3.2 presents some of the cross-linguistic evidence for the feature [liquid] and section 3.3 for the SV node.

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3.1. Introduction.
The distinctive features for the consonants listed in 2a,b are given in 3.[2] The seventeen columns have been divided into six traditional manner categories: voiceless stops, voiced stops, affricates, fricatives, nasals, and liquids. The features in 3 are assumed to be privative; hence, a segment bears a feature, in which case it has "√," or it does not, in which case it lacks that feature altogether. The features in 3 are arranged hierarchically in an approach to feature geometry that I describe in detail in section 3.3 below. All segments in 3 are assumed to bear [consonantal], which I henceforth omit.

(3) Distinctive features for IG consonants

	VC STOPS			VD STOPS			AFFRIC.		
	p	t	k	b	d	g	pf	ts	kx
[SV]				√	√	√			
[liquid]									
[lateral]									
[nasal]									
[continuant]									
[strident]							√	√	√
[PLACE]	√	√	√	√	√	√	√	√	√
[LABIAL]	√			√			√		
[CORONAL]		√			√			√	
[DORSAL]			√			√			√

[2] I omit /ʃ/ and /tʃ/ from 3 because the place feature that distinguishes these sounds from /s/ and /ts/ is not relevant for my analysis. I also disregard /h/, which I assume to be a placeless obstruent.

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	FRIC.			NASALS			LIQUIDS	
	f	s	x	m	n	ŋ	l	r
[SV]				√	√	√	√	√
[liquid]							√	√
[lateral]							√	
[nasal]				√	√	√		
[continuant]	√	√	√					
[strident]								
[PLACE]	√	√	√	√	√	√	√	√
[LABIAL]	√			√				
[CORONAL]		√			√		√	√
[DORSAL]			√			√		

In general, the place features in 3 do not play a role in the present analysis and will therefore be ignored. The one exception is the status of the place features for /r/, which I discuss below. The first six features in 3 require comment. Let us consider first the four manner features [nasal], [lateral], [continuant], and [strident].

All and only nasal consonants bear [nasal]. I adopt the standard view that [lateral] distinguishes /l/ and /r/ (for example, Cohn 1992, Blevins 1994, Kenstowicz 1994, Odden 2005, although these phonologists view the feature as binary). My privative treatment of [lateral] is similar to the one proposed by Rice & Avery (1991) and other researchers. The feature [continuant] distinguishes fricatives from stops: Rice (1992:88–89) adopts a featural model like the one endorsed here in which [continuant] is privative. A number of phonologists have argued that the same feature can also be used to distinguish /l/ from /r/ (see Mielke 2005 for a recent discussion), but this is not the case in Imst German. The feature [strident] distinguishes affricates from stops (see Jakobson et al. 1952, LaCharité 1993, Rubach 1994, Clements 1999, Kehrein 2002); that is, affricates bear [strident] and stops do not.

The approach to features adopted in 3 and below differs from treatments that have underspecified matrices with default rules filling in the redundant values, that is, the minus values (for example, Archangelli 1988). According to the latter theory, these default rules can be freely ordered with other phonological rules. By contrast, Avery & Rice (1989) and many other researchers see such default rules as belonging to the phonetic component. My treatment is more compatible with the latter

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approach because there does not seem to be evidence that the negative values of the privative features in 3 play a role in IG phonology.[3] Evidence that default features do not play a role in the phonology and that they therefore belong to the phonetic component will be discussed below.

The features in 3 are intended to hold for Imst German as described in 1897 by Joseph Schatz (and probably also after that date). I also assume that these same features hold for earlier stages of Imst German as well, in particular the stages of that dialect immediately prior to the changes involving fricatives (see section 6.1), that is, the Bavarian dialect of Middle High German (MHG).

The only significant difference between the consonants in Imst German in 3 and the corresponding consonants in the Bavarian dialect of Middle High German is that surface [r] in the latter stage was coronal (that is, denti-alveolar) and not dorsal (that is, uvular); see Schatz (1897:94). That IG /r/ is uvular on the surface is captured in the synchronic phonology of Imst German with the default rule in 4.

(4) Default Rule
/r/ → [DORSAL]

The Default Rule adds the feature [DORSAL] to the underlying [CORONAL] /r/ sound in 3, thereby producing a sound that is [DORSAL] and [CORONAL]. That a phonetically dorsal sound can behave phonologically as coronal is not unusual. See, for example, Hall's (1995) analysis of Standard German uvular [R], which patterns phonotactically with coronal sounds. It is also instructive to consider Blevins's (1994) analysis of the velar lateral /L/ because this surface dorsal sound behaves

[3] This approach to features makes implicit claims concerning the kinds of natural classes that should and should not play a role in Imst German. For example, according to 3 only affricates and not strident fricatives (/s ʃ/) bear the feature [strident]. One would therefore not expect to find a phonological rule referring to this broad natural class of affricates and /s ʃ/. No evidence to my knowledge exists from Imst German for the natural class of /s ʃ/ and affricates, although it needs to be stressed that this particular example does not bear directly on my analysis.

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in many languages phonologically as coronal.[4] To capture the phonological patterning of /L/, Blevins (1994:317) argues that in languages like Yagaria and Kanite it is underlyingly [CORONAL] and that [DORSAL] (and its dependent features) are added by default.

3.2. The Feature [liquid].

The analysis developed in section 5 below depends crucially on the feature [liquid], which is present on both laterals (/l/) and rhotics (/r/). Although [liquid] is not usually assumed in the theoretical literature, it has been defended by Walsh Dickey (1997) and is adopted below.

There is widespread agreement that (sonorant) laterals like /l/ and (sonorant) rhotics like /r/ form a natural class. The cross-linguistic evidence for the natural class of liquids consists of at least three pieces of evidence (from Walsh Dickey 1997:142ff.): (a) phonotactic restrictions on laterals and rhotics as a class, (b) the patterning together of laterals and rhotics in phonological processes, and (c) OCP restrictions on laterals and rhotics.[5]

Evidence for (a) derives from the avoidance of laterals and rhotics together in a particular context. For example, a number of languages are attested in which liquids are banned from occurring in word-initial position, for example, Diyari, Djabugay, Kuman, and Mongolian. An example illustrating (b) is the deletion of the retroflex lateral before any liquid consonant in Djaru. OCP restrictions on [liquid] (see (c) above) involve languages that avoid adjacent liquids. There are a number of such languages. For example, in Yidiny (an Australian language with the three phonemic liquids /l r ɹ/) there are various consonant clusters, including those with liquids. However, there are no consonant clusters consisting of two liquids in sequence. Significantly, Walsh Dickey (1997) demonstrates that this gap cannot be reduced to restrictions on place of articulation (that is, the avoidance of coronals or the avoidance

[4] The best known velar laterals occur in Papuan languages like Mid-Waghi, Medlpa, Kanite, and Yagaria. There are also non-Papuan examples with [L]; see Blevins (1994:312–313) for discussion.

[5] The generalizations discussed below pertain only to sonorant liquids (for example, lateral approximants like /l/) because there is excellent evidence that obstruent liquids (for example, lateral fricatives) do not pattern phonologically with sonorant liquids.

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of apicals), nor can it be reanalyzed as a sonority-based restriction. Similar examples involving the avoidance of adjacent liquids can be found in Gumbaingar and Javanese.

The feature [liquid] (Dixon 1972, Walsh Dickey 1997) has the advantage of capturing the natural class of /l/ and /r/ directly. Given this feature, the phonotactic restrictions described above require a statement to the effect that [liquid] is disallowed word-initially and the context in the rule in Djaru refers consequently to [liquid] segments. OCP restrictions can also be captured directly with a feature-specific constraint, for example, OCP-[liquid]: *[liquid] [liquid]. I show below that this constraint is active in Imst German and that it triggers the change in 1b.

Walsh Dickey (1997) argues that [liquid] is on par with other major class features like [consonantal] in the sense that it is a part of the ROOT node. As I demonstrate below, I depart from this treatment because I analyze [liquid] as a manner feature that displays autosegmental behavior (that is, delinking). Ultimately, I show that [liquid] is a daughter of SV.

Consider now two obvious alternatives to the feature [liquid]. In traditional phonological theory the natural class of (sonorant) laterals and (sonorant) rhotics is captured with a set of three features, namely [+consonantal, +sonorant, –nasal]. However, as pointed out by Walsh Dickey (1997:151), there are two problems with this analysis. First, it is not clear how this proposal can capture the contrast in certain languages (for example, Igbo) between plain and nasalized rhotics. If liquids are inherently non-nasal, then the existence of nasalized liquids is problematic. Second, there is excellent cross-linguistic evidence that nasality is a privative property, meaning that there is no evidence for the lack of nasality (that is, [–nasal]). The privative nature of [nasal] has been defended by Avery & Rice (1989) and Piggott (1992), among others. Assuming that the negative value of [nasal] does not exist, the traditional way of capturing the natural class of liquids is simply not an option.

According to another approach (for example, Clements 1990:292ff.), liquids are characterized as [–vocoid, +approximant, +sonorant]. The feature [vocoid] is the converse of [consonantal], so [–vocoid] is equivalent to [+consonantal]. In Clements's featural system [+approximant] sounds subsume all liquids (for example, /l r/), all vowels and all glides (for example, /j w/). The reason [liquid] is not the same as [approximant]

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is that the latter feature includes vowels and the former one does not.[6] While this approach does not suffer the drawbacks described above for the traditional analysis of liquids, it is unclear how the OCP-constraint and liquid dissimilation described below in section 5 would translate into a system in which liquids are captured with three features as opposed to one.[7]

3.3. The SV Node.

A model of segment structure relying crucially on the node SV ("Sonorant Voice") has been developed by a number of researchers, in particular Rice & Avery (1991), Rice (1992, 1993), Brown (1992), Piggott (1992), and Frigeni (2005). According to these authors, SV replaces the traditional feature [sonorant] and is underlyingly present in all sonorants as well as obstruents that function phonologically as sonorants, that is, what Rice calls "sonorant obstruents." In 3, we can see that not only the nasals and liquids (that is, the traditional sonorant consonants) bear SV, but also the three voiced stops /b d g/. By contrast, voiceless stops, (voiceless) affricates, and (voiceless) fricatives all lack SV.

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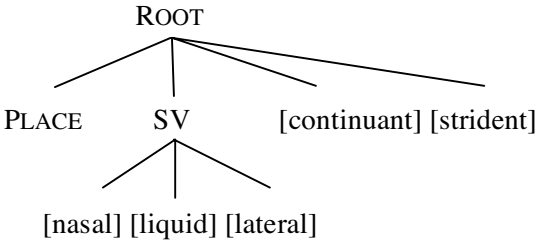
[6] The feature [+approximant] is not the same as the traditional phonetic category "approximant." According to Ladefoged (1993:64ff.), approximants subsume sounds I am referring to as liquids as well as glides, but not vowels. See also the IPA chart, which classifies the sound /j/ (which I call a "glide") as an "approximant."

[7] An anonymous reviewer asks why the feature bundle [–vocoid, +approximant, +sonorant] cannot dissimilate instead of [liquid]. Given this alternative approach, the OCP constraint would presumably ban sequences of adjacent segments that bear these three features. Technically, this alternative works. Note that the reviewer's approach presupposes that (a) dissimilations can affect feature bundles as opposed to single features, and (b) dissimilations can affect major class features. By contrast, I hold that my analysis is more constrained and hence more desirable because it adopts neither assumption (a) nor (b). See section 6 below, in which I demonstrate that Imst German only avoids adjacent (single) manner features which are identical. It is interesting to note that Suzuki's (1998) typology of dissimilations (summarized in Alderete & Frisch 2007:382) does not include any examples involving the dissimilation of the major class features [consonantal], [sonorant], and [approximant].

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The features in 3 are arranged hierarchically in the feature-geometric representation in 5. The ROOT node dominates PLACE, SV, and [continuant], while SV dominates [nasal], [liquid], and [lateral]. I tentatively assume that [strident] is dominated directly by the ROOT.

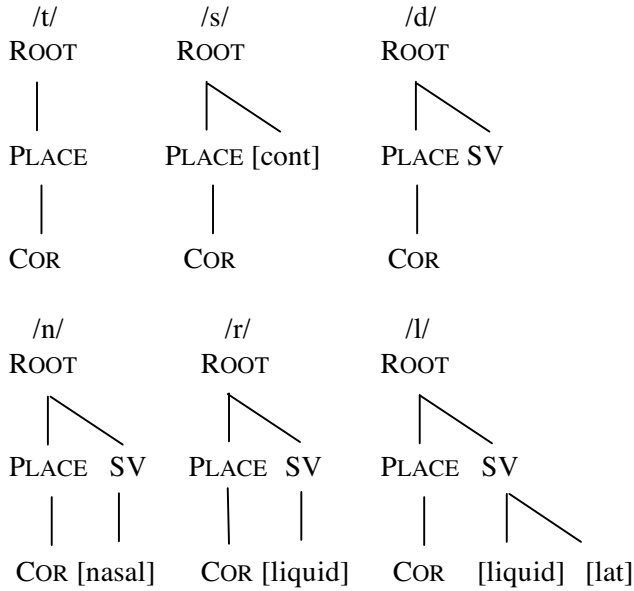
(5) Feature geometric representation



The structure in 5 is illustrated for the six coronal ([COR]) consonants in 6. These sounds represent six of the seven of the manner categories in 3. I omit the affricate [ts] (representative of the seventh manner category in 3) because it is not relevant for the ensuing analysis. All ROOT nodes in 6 and below are assumed to consist of the feature [consonantal] (McCarthy 1988).

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(6) Representations for six coronal consonants



As obstruents, /t/ and /s/ have no SV node; the latter bears [continuant] ([cont]) and the former lacks this feature altogether. Sonorant obstruents like /d/ have an SV node, but in contrast to true sonorant consonants, the SV node for segments like /d/ has no dependent features. True sonorant consonants like /n r l/ have by definition not only SV, but also at least one dependent feature. For nasals like /n/ this dependent feature is [nasal], for /r/ it is [liquid], and for /l/ it is [liquid] and [lateral] ([lat]).[8]

The contrast between sounds like /p t k/ and /b d g/ is often assumed to involve the feature [voice] (for example, Wiese 1996 for Standard German), but [voice] is not necessary given my use of the feature SV. Note too that SV in 3 is not exactly the same as [+voice] because the latter feature is usually assumed to be present underlyingly for sounds like /b d g/ and redundant for sonorants (see Wiese 1996). Alternatively, several linguists have argued that German /p t k/ vs. /b d g/ contrasts are captured with the (privative) feature [spread glottis], for example,

[8] I make no claims concerning the universality of the representations in 6. Some evidence that /r/ can have a very different featural representation in other dialects of German is discussed briefly in section 7 below.

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Iverson & Salmons (1995) and Jessen & Ringen (2002). On that view, /p t k/ are underlyingly [spread glottis], while /b d g/ are unmarked for that feature. Assuming that there is evidence from Imst German that /p t k/ behave phonologically as [spread glottis] sounds, one could conceivably modify the features in 3 by including the LARYNGEAL node and [spread glottis] for /p t k/. Thus, I see my treatment as being compatible with the [spread glottis] analysis. The nature of the laryngeal phonology of Imst German is a question I do not investigate here and hence I leave this topic open for further research.[9]

4. Dissimilations.

In this section, I discuss two of the properties that have been argued to hold for dissimilatory changes in general (section 4.1). I then introduce the approach to dissimilations adopted below, namely that dissimilations delink a feature as a response to an OCP constraint (section 4.2).

4.1. Properties of Dissimilations.

Two properties that have been argued to hold for dissimilations are: (a) dissimilations are sporadic and not regular, and (b) dissimilations are structure preserving. I show below that (b) but not (a) is a consistent property that characterizes dissimilations.

A common statement involving dissimilations in textbooks is that this type of process is irregular, or sporadic (for example, Hock & Joseph 1996:125–126, 141), although it needs to be said that this statement is made in reference to dissimilatory sound changes, as opposed to synchronic processes of dissimilation. While many dissimilatory sound changes are indeed sporadic, it is important not to lose sight of the fact that there are also many well-attested examples of regular dissimilations (see Campbell 2004:30–32 for discussion). Examples of regular dissimilations mentioned by Campbell include Grassmann's Law in Greek and Sanskrit, Dahl's Law in Bantu, and the change of /k/ to [h] before /t d/ in

[9] It is not clear how similar Imst German is to other dialects of German with respect to the phonology and phonetics of voicing and aspiration. For example, unlike other varieties of German, IG [b d g] can occur in syllable-final position. Schatz (1897) does not say explicitly whether or not final [p t k] are aspirated. According to Kranzmayer's (1956:iv) discussion of Bavarian German in general, /p t k/ are described as "unaspirated" ("unbehaucht").

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Finnish. (For an additional example of a process that was obviously dissimilatory and regular, see section 6.1 below.) Because regular diachronic dissimilations are attested, I hold that property (a) above is a tendency at best.

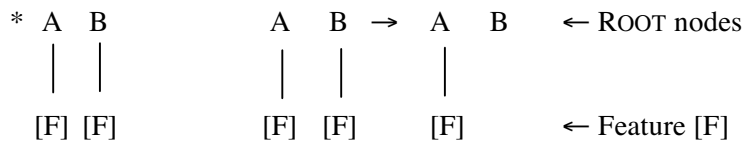
A second property that has been argued to characterize dissimilations is Structure Preservation (see, for example, Ohala 1993:255–256 and Kiparsky 1995:658). Structure-preserving changes are changes in which the output is a phoneme of the language, whereas non-structure preserving processes are ones that introduce a non-phoneme (that is, an allophone). Allophonic processes are by definition non-structure-preserving. By contrast, the studies referred to above have demonstrated that all attested dissimilatory changes are structure preserving—a finding that is confirmed for processes argued to be dissimilatory in sections 5.2 and 6.1. Since the structure-preserving property is a consistent cross-linguistic property, I adopt it in my treatment below.

4.2. Dissimilation and the OCP.

Following Yip (1988) and Cohn (1992), I analyze dissimilations as a repair mechanism applying as a response to a feature-specific OCP constraint (see also the discussion in Alderete & Frisch 2007). The general approach adopted here is outlined in 7. The feature [F] in 7a and 7b is assumed to be privative and not binary.

(7) Approach to dissimilations adopted below

a. OCP constraint b. Change motivated by an OCP violation



Dissimilation itself is schematized in 7b as the deletion of a feature [F] when adjacent to the same feature. Languages specify in 7b (i) whether the first or second [F] deletes, and (ii) whether the root nodes A and B are adjacent. In the case of root nodes A and B which are non-adjacent, the delinking in 7b involves a long-distance dissimilation, for example, the dissimilation of /l…l/ to [l…r] in Latin; see [nav-alis] 'naval' vs. [sol-aris] 'solar' (Steriade 1987:351).

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The authors cited above see dissimilations as in 7b, although both Yip (1988) and Cohn (1992) assume that the feature that dissimilates is binary, in which case the delinking in 7b is followed by a default rule adding the negative value, that is, [–F]. As explained above, the approach I adopt eschews default rules that fill in negative values.

The basic analysis of dissimilations as described below is also the one often adopted in OT analyses of dissimilations (see Alber 2000 and Hall & Scott 2007 for examples from German). Some work in the OT framework has identified various problems with the analysis of dissimilation as a response to an OCP violation; for example Alderete 1997 and Suzuki 1998. The former author argues that dissimilations are triggered by a local conjunction and the latter that the trigger is due to a "generalized OCP" constraint violation (Suzuki 1998:27). Suzuki (1998:16–26) lists five problems (from the cross-linguistic perspective) with the traditional OCP analysis I adopt above, but I do not see these problems as being relevant to the IG examples I discuss below.[10] A question I leave open for further study is whether or not the approach taken by Alderete (1997) or Suzuki (1998) can offer a deeper explanation for the phonology of Imst German than the one I propose.

5. The Behavior of Adjacent Liquids in Imst German.

In this section I present data from Imst German illustrating the instability of adjacent non-identical liquids (section 5.1) and my analysis thereof (section 5.2). In section 5.3 I consider the status of adjacent identical liquids, and in section 5.4 I discuss and reject several alternative analyses.

5.1. Adjacent Non-Identical Liquids.

Examples illustrating the historical change from MHG /r/ to IG /d/ before a tautomorphemic /l/ are presented in 8 below (Schatz 1897:94). The Standard German orthographic forms (which can be equated with MHG)

[10] One of the problems described by Suzuki is that the OCP approach cannot handle languages in which non-featural properties dissimilate; for example length dissimilates in Gooniyandi, Gurindjiand, and Yindjibarndi. Since there do not appear to be non-featural properties dissimilating in Imst German, I do not see this type of example as problematic in the present context.

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are presented in the first column and the corresponding IG forms in the second column.[11]

(8) MHG /r/ > IG /d/ / ___ /l/ within a morpheme

Kerl	[kxɑːdl]	'fellow'
Karl	[kxoːdl]	'Karl'
Erle	[øidlə]	'alder'
Scharlach	[ʃodlox]	'scarlet fever'
Heuhaufe[n]	[piədlig]	'haystack' (MHG birlinc)

The sound change in 8 did not simply involve a restructuring of the underlying representations because it caused many morphemes to arise with [d] ~ [r] alternations. This point can be illustrated with the additional examples in 9. In 9a the same historical change in 8 took place across a morpheme boundary and in 9b it occurred across a word boundary. In both data sets we see a word ending in [r] in isolation which is realized in Imst German as [d] if the next sound is [l]. The page numbers in the final column in 9 refer to Schatz 1897. The final example in 9a was obtained from Hathaway 1979:31.

(9) IG [d] ~ [r] alternations

a.	schwer	[ʃwɑːr]	'hard'	p. 46
	schwerlich	[ʃwɑːdlig]	'hardly'	p. 94
	Tier	[tiər]	'animal'	p. 64
	Tierlein	[tiədlə]	'animal (dim.)'	p. 94
	Mauer	[maurə]	'wall'	p. 59
	Mäuerlein	[maidlər]	'wall (dim.)'	

[11] Although Schatz does not transcribe the final [l] in the first two examples in 8 as syllabic, this was probably an oversight, since he is otherwise consistent in indicating a word-final [l] as syllabic if it appears after an obstruent. The lengthening of the vowel in the first two examples in 8 occurred by an independent change after the change from MHG /r/ to IG /d/ (Schatz 1897:51).

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b.	wer	[weɑr]	'who'	p. 160
	wer läuft	[weɑdlouft]	'who runs'	p. 94
	Geschirr	[kʃiər]	'dishes'	p. 53
	das Geschirr leihen	[skʃiədlɑihə]	'the dishes borrow'	p. 94

The alternations in 9 require /r/ to be analyzed as the underlying sound with /r/ → [d] __ /l/ as a synchronic rule of Imst German. For example, the first two words in 9a are /ʃwɑːr/ and /ʃwɑːr-lig/ and /r/ becomes [d] in the second example. The reason the alternations in 9 cannot be analyzed with an underlying /d/ and a process converting this sound into [r] word finally is that Imst German has many words with a word-final surface [d], for example, *Rad* [roːd] 'wheel' (p. 141), which would incorrectly be converted into [r].

Schatz's (1897) description of the development in 8 and 9 leaves little doubt that this was a regular, neogrammarian sound change (as opposed to a sporadic one): "Today every *r* is pronounced as *d* before *l* within words and between sentences."[12] It is also worth emphasizing that the change from /r/ to [d] occurs only before /l/ and nowhere else. Examples in which [r] surfaces before other sounds abound in Imst German; for example, *gewahr werden* [gwoːrnə] 'become aware of something' with [rn] and *Dirne* [diərnə] 'prostitute' (pp. 25, 64); *warmer* [wørmər] 'warmer' (p. 25) and *Wurm* [wurm] 'worm' with [rm].[13]

[12] "Heute wird vor *l* jedes *r* im Worte und beim Zusammentreffen im Satze als *d* gesprochen. "

[13] More recent commentators have also noted that IG /r/ shifts to [d] before [l], for example, Hornung & Roitinger (2000:118). The reader is referred to Kranzmayer (1956:124), who notes the change from /r/ to [d] before [l] in varieties of Central Bavarian. However, the dialects described by Kranzmayer do not appear to be the same as Imst German because /r/ also changes to [d] before [n] in the former, but not in the latter. I restrict the analysis below to the data in Schatz 1897 and leave open how the analysis might be extended to cover the material presented in Kranzmayer 1956. I am unaware whether there are German dialects outside of Bavarian with the regular change in 12 and 13. In her description of the High Alemannic dialect spoken in Wallis (Switzerland), Wipf (1920:108–109) notes that etymological [r] can be pronounced in that dialect as [d] before [l], although she is clear that this deveopment is sporadic and not regular.

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It is perhaps worth noting that the [dl] cluster created by the development in 8 and 9 was not a new cluster, since it was inherited in other words, for example, the surface [d] in *Stadel* [ʃtoːdl] 'repository' (p. 89) and *Mädchen* [mɑːdlə] 'girl (dim.)' (p. 89) goes back to [d] in Middle High German. Thus, the development in 8 and 9 did not result in clusters that were novel to Imst German.

Schatz (1897:94) observes that a development parallel to the one in 8 and 9 involved the shift from MHG /r/ to IG [d] after /l/, as in 10. In these examples, the Standard German orthographic form is presented in the first column, the MHG form in the second column, and the IG equivalent in the third column. Note that the two liquids in the original sequence /lr/ in Middle High German were tautomorphemic.

(10) /r/ > /d/ / /l/ ___ in Imst German

Söller	MHG solre	[soldər]	'loft'
poltern	MHG bölren	[pøldərə]	'rumble'
stark widerhallen	MHG $^{+}$hülren	[hildərə]	'echo strongly'
lärmen	MHG kolre	[kxoldərə]	'make noise'

Schatz does not provide examples of the change in 10 across morpheme or word boundaries parallel to the ones in 9. Perhaps one reason for this omission is that there do not appear to be *r*-initial suffixes in Imst German that would have an alternant beginning with [d] after a stem ending in [l]. This being said, examples in connected speech in which one word ends in /l/ and the following word begins with /r/ should not be difficult to come by. Although Schatz does not give examples of such across-word alternations, it is noteworthy that there do not appear to be any examples in his 1897 grammar (nor in Hathaway 1979) of words (or sentences) containing surface [lr] clusters. Assuming that this gap is systematic, I adopt the view that the change in 10 is a synchronic process of Imst German.

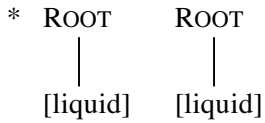
5.2. The Analysis.

Given the representations for consonants in 6, I analyze the change from /rl/ to [dl] (as well as the mirror image development) as a dissimilation of the feature [liquid], which itself applies as a response to the feature-specific OCP constraint in 11. The prose statement of the change in 12a

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is intended to express both changes depicted in 12b. The OCP constraint in 11 needs to specify that the two segments are ROOT-node adjacent because there are many examples of IG words containing non-adjacent liquids in which no change occurs, for example, *traurig* [t**r**au**r**ig] 'sad' (p. 93).

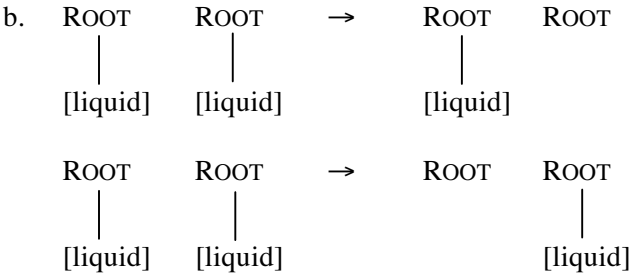
(11) OCP-[liquid] (ROOT nodes are adjacent)



(12) Liquid Dissimilation

a. Delete [liquid] when adjacent to [liquid]

b.

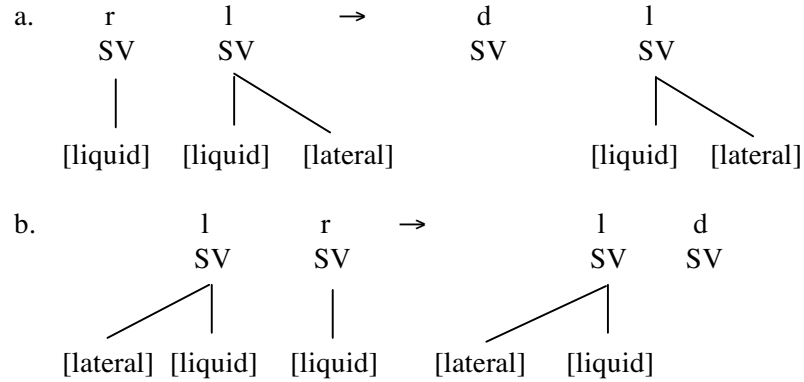


Liquid Dissimilation in 12 simply states that [liquid] should be deleted, but it does not specify whether or not the feature deletes from /l/ or /r/. I show below that my analysis offers a principled reason why [liquid] can only be eliminated from the latter segment.

Consider now the derivations from /rl/ to [dl] in 13a and from /lr/ to [ld] in 13b. In these derivations I consider all and only the node SV and its dependents.

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(13) [rl] → [dl] and the mirror-image



In 13a we can observe that the OCP constraint in 11 bans the sequence of two liquids to the left of the arrow and that Liquid Dissimilation applies as a response to this OCP violation (recall 7). The mirror image development is depicted in 13b. In both 13a,b the deletion of [liquid] from the /r/ results in a segment with the SV node but without any dependent manner features. An examination of 6 reveals that this segment can only be interpreted as the (homorganic) stop /d/ because /d/ (as opposed to /t/) is analyzed as a sonorant obstruent with an SV node without any dependents.[14]

[14] In 3, I analyze the three stops /b d g/ as sonorant obstruents (that is, as sounds with a bare SV node), but I have only demonstrated above that /d/ has this representation. In fact, there appears to be independent evidence that /b/ behaves phonologically as a sonorant obstruent because it alternates with the true sonorant [w]. According to Schatz (1897:81), there are regular alternations in Imst German like the ones in i.

(i) freuen [fʀœiwə] 'be pleased'
ich freue [ifʀœib] 'I am pleased'

An examination of these and other examples illustrate that [w] occurs in onset position before a vowel and [b] syllable-finally after a vowel or liquid. I do not provide an analysis of the alternation in i, but I assume that it can be analyzed in the model proposed in the present article by treating both /b/ and /w/ as SV. Schatz (1897:10–11) implies that there are similar alternations involving the stop [g] and the glide [j] (which he transcribes as [i̯]), where the latter articulation only occurs after [i]; for example, *steigen* 'climb' is (optionally)

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Liquid Dissimilation simply states that the feature [liquid] should be eliminated, but it does not say whether or not the feature deletes from /l/ or /r/. In fact, this need not be specified in the rule because the correct result is obtained given the structure preserving property of dissimilations. Given Structure Preservation, the [liquid] on /r/ can delete because the output is a sound with SV without any manner features, which can only be the stop /d/. Were the feature [liquid] to delete from /l/, then the result would be a segment with SV that bears only one manner feature, namely [lateral], but there is no such segment in Imst German.

In contexts other than before or after /l/, IG /r/ surfaces as a uvular (that is, [DORSAL]) sound (recall 4). I follow Schatz (1897:93), who holds that the historical change in 8 and 9 took place at a point in time before /r/ shifted to a uvular sound.

In section 3.1, it was stated that default rules like the one in 4 are assumed to apply in the phonetic component and that they therefore do not interact with phonological processes. My treatment of IG /r/ supports this approach. /r/ is underlyingly [CORONAL] and must remain so throughout the postlexical phonology because Liquid Dissimilation is postlexical. The domain of Liquid Dissimilation must be the postlexical component because the process applies across words; recall 9b. In the phonetic component, all /r/'s not specified for place features receive [dorsal] via 4.

Although it is often claimed that only lexical processes can be structure preserving (for example, Kiparsky 1985, and much subsequent work in Lexical Phonology), my analysis crucially depends on analyzing Liquid Dissimilation as structure preserving. I follow Rice (1990) and Hyman (1993), who show on the basis of data from non-Germanic languages that non-structure preserving processes may persist into the postlexical phonology. My analysis therefore suggests that it is not the component (that is, lexical vs. postlexical) that tells us which rules are structure preserving, but instead it is the rule type: dissimilations are always structure preserving even if they are postlexical.

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realized as [ʃtɑijə] (or [ʃtɑigə]). I hold that alternations between [g] and [j] can be accounted for by analyzing both sounds as SV, although I leave an analysis of the rule open for further research.

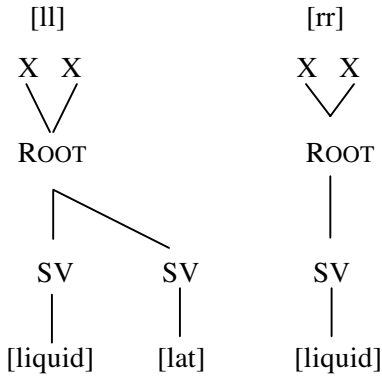
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5.3. Adjacent Identical Liquids.
Since the analysis of Liquid Dissimilation in section 5.2 depends crucially on the constraint OCP-[liquid], the implication is that sequences of adjacent identical liquids should be avoided in Imst German as well. In fact, there is excellent evidence that this is the case.

Consider first tautomorphemic geminate liquids, that is surface [ll] and [rr], which I pointed out in section 2 are allophones of /l/ and /r/ respectively. At face value, [ll] and [rr] appear to be problematic if they consist of two separate identical segments, each bearing the feature [liquid]. Particularly [rr] might seem to be troublesome because it is not pronounced [dr], for example, *Karren* [kxorrə] 'cart' (Schatz 1897:94). In fact, the behavior of [ll] and [rr] is not surprising if such tautomorphemic geminates consist of a single ROOT node whose length component is expressed with skeletal slots or moras (see Hayes 1986, and much subsequent work by other authors). The nonlinear representations just described are presented in 14a, where "X" can be interpreted either as a mora or skeletal slot. This representation contrasts with the one in 14b, which is usually assumed to hold for heteromorphemic geminates.

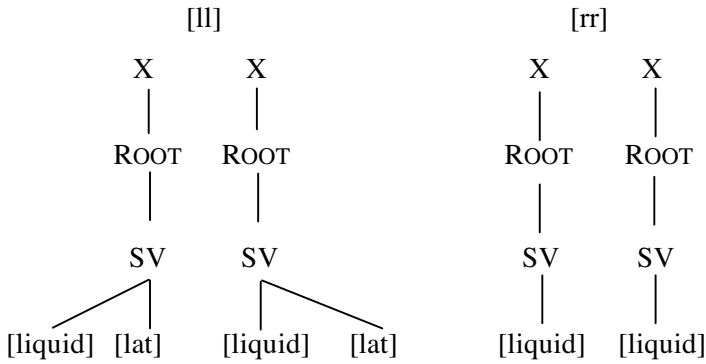
(14) Representations of [ll] and [rr]

a. Tautomorphemic geminates



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b. Heteromorphemic geminates



Given the representation of 'true' geminates in 14a, Liquid Dissimilation cannot affect the "first" /r/ in [rr], because the representation just described has only a single instantiation of [liquid].

Consider now adjacent heteromorphemic sequences of identical liquids. As noted earlier, Imst German apparently has no *r*-initial suffixes; hence the question is how the language deals with suffixes beginning with /l/ which potentially attach to stems ending in /l/. The data in 9a above illustrate that Imst German possesses two /l/-initial suffixes (Schatz 1897:70–71), namely the adjectival suffix [lig] and the diminutive suffix [lə]. Schatz does not discuss what happens when a stem ending in /l/ occurs before the adjectival suffix [lig], although it appears doubtful that such words exist.[15]

There is an extended discussion in Schatz (1897:70–71) concerning the distribution of the diminutive suffix [lə] and its allomorph [ələ]. In 15a we can see that the former allomorph occurs after stems ending in any consonant other than /l/, while the latter allomorph surfaces after stems ending in singleton [l] or geminate [ll] (in 15b). Note that in Standard German the diminutive suffix *-lein* is avoided and that *-chen* is used in its place after stems ending in /l/ (see Plank 1981:156).

[15] Even in Standard German there are no words of this structure; see, for example, the online word list at http://wortschatz.uni-leipzig.de, which can be used as a backwards dictionary.

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(15) Diminutive suffix allomorphy in Imst German

a.	Berglein	[pɑrglə]	‘mountain (dim.)’
	Wieslein	[wiːslə]	‘meadow (dim.)’
	Blümlein	[pliə̃lə]	‘flower (dim.)’
b.	Tälchen	[tɑːlələ]	‘valley (dim.)’
	Seilchen	[soɑlələ]	‘rope (dim.)’
	Schälchen	[ʃɑːlələ]	‘bowl (dim.)’
	Schnalle	[ʃnɑllələ]	‘strap (dim.)’

What the data in 15 suggest is that the constraint OCP-[liquid] in 11 also prevents the concatenation of /…l-l…/. The implication is that such /l-l/ sequences cannot have the representation in 14a as “true” geminates; otherwise they would not violate OCP-[liquid]. Instead, at the level of grammar where word formation takes place (that is, in the lexical component) heteromorphemic (that is, “fake”) geminates must be represented as a sequence of identical segments (with one instantiation of [liquid] each), as in 14b.

The behavior of /l-l/ and /r-r/ in connected speech (that is, at the postlexical level) is also compatible with the present analysis. After words are concatenated into sentences, fake geminates with two identical ROOT nodes, as in 14b, arise. Schatz (1897:24) observes that /l-l/, /r-r/ as well as the corresponding nasals, undergo degemination after long vowels, for example, *Qual leiden* /kwoːl # lɑidə/ ‘suffer agony’ surfaces as [kwoːlɑidə]. I sketch briefly what an analysis of such examples might look like: The change from /l-l/ to [l] suggest that the fake geminates in 14b are transformed first into the real geminates in 14a and that the root node in this structure bears a mora associated with the preceding syllable. Assuming that Imst German bans trimoraic syllables, then a surface form like *[kwoːllɑidə] cannot be correct because the first syllable would contain three moras. The true geminate in examples like this one are subsequently repaired by reducing the geminate to a singleton (which is no longer moraic).

5.4. Alternative Analyses.

An obvious alternative to Liquid Dissimilation in section 5.2 is to reanalyze this process as an assimilation, although it is not clear how this

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should be done. Virtually all approaches to phonological features view /l/ and /r/ as [+sonorant] and /d/ as [–sonorant]. Given that the output [d] is a stop (that is, [–continuant]), it might be reasonable to analyze /l/ as [–continuant] (see Mielke 2005) in order to analyze the change from /r/ to [d] before /l/ as an assimilation. Given the features just described, the reanalysis of Liquid Dissimilation as an assimilation might be expressed linearly as in 16. That the output is [d] and not [t] could be captured by stipulating that the /r/ in the input has already been assigned [+voice] by default. Alternatively, if [spread glottis] is assumed to distinguish /t/ from /d/, then /r/ (which is unmarked for laryngeal features) would correctly shift to [d] because this sound is unmarked for laryngeal features.

(16) Hypothetical assimilation

[+son, +cont] → [–cont, –son] / __ [+son, –cont]

Note that the change from /r/ to [d] entails not only a change in continuancy, but also in sonorancy. However, while the rule in 16 assimilates the former feature, the latter feature simply changes its plus into a minus in a non-assimilatory way. The obvious problem with 16 is that it requires a process to assimilate one feature ([continuant]) and change the value in another ([sonorant]).[16] This formal problem does not arise in the analysis defended above in section 5.2 since the deletion of [liquid] in /r/ automatically entails that the output is [d].

Note too that the present analysis—with its reliance on OCP-[liquid]—sees a direct connection between the instability of /r-l/ and the avoidance of identical liquids described in the preceding section. It is not clear how the alternative in 16 can establish a link between the change expressed in that process and the examples involving the diminutive suffix allomorphy in 15.

A second alternative treatment might attempt to analyze Liquid Dissimilation as a change motivated not by the violation of OCP-[liquid], but instead by the avoidance of bad syllable contacts. Assuming that /l/

[16] It looks as if the feature [sonorant] is dissimilating in 16. No rule in known to me in any language that assimilates one feature and dissimilates another. Recall from note 7 that there are apparently no examples attested of rules dissimilating major class features like [sonorant].

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and /r/ are equally sonorous in Imst German, the change from /ʃwɑːr-lig/ to [ʃwɑːˑdlig] (see the second example in 13a) might make sense because the sonority plateau in the incorrect surface form *[ʃwɑːr.lig] would violate the Syllable Contact Law (Hooper 1976, Murray & Vennemann 1983, Green 1997, Ham 1998, Harris 1994, Davis & Shin 1999, and Rose 2000). Note that this alternative requires [dl] in [ʃwɑːˑdlig] to be tautosyllabified because the heterosyllabic parse would surface with a bad syllable contact.

While it does appear that Liquid Dissimilation has the function of eliminating bad syllable contacts, this analysis cannot replace OCP-[liquid] because Imst German allows for many "bad" syllable contacts which are not repaired, for example, *Bäumlein* [pɑ̃ːm.lə] 'tree (dim.)' (Schatz 1897:25) with a heterosyllabic nasal-liquid. Equally inexplicable is the fact that the /r-l/ contact being repaired is better in terms of its sonority profile than ones like /m-l/ which are not repaired.

A third alternative to the present proposal is discussed briefly by Schatz (1897:94), who suggests that the process I have analyzed as Liquid Dissimilation really involves the epenthesis of [d] between /r/ and /l/ (and between /l/ and /r/). He holds that this epenthesis analysis in sequences like /rl/ and /lr/ derives support because the epenthetic [d] is observable in other contexts, for example, between [n] and [l] (*Männlein* [mɑndlə] 'man (dim.)' (from /mɑn-lə/), p. 45).

I see three arguments against an epenthesis analysis. First, it is not clear what would motivate the epenthesis of /d/ between /r/ and /l/, /l/ and /r/, and /n/ and /l/, but not between /r/ and /n/ (recall the [gwoːrnə] example mentioned above). Second, it is not clear that the epenthesis Schatz describes was a regular development in Imst German; for example, Hathaway (1979:19) has the original /nl/ sequence in the word *wahrscheinlich* 'probably' with [nl] and not [ndl].

But the most serious drawback with an epenthesis analysis is that it is not clear how speakers of Imst German since 1897 have been able to deduce that this is the correct process given the data in 9. If the [r] ~ [d] alternations in Imst German were to be captured with a rule of *d*-epenthesis, then the treatment would also require a rule of *r*-deletion; for example, an input like /ʃwɑːr-lig/ would undergo *d*-epenthesis to /ʃwɑːrdlig/, followed by *r*-deletion to [ʃwɑːdlig]. However, there is no evidence in Imst German for a synchronic process of *r*-deletion. It is certainly conceivable that the [r] ~ [d] alternations in 9 had their origins

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in the epenthesis of [d], but this historical analysis does not necessarily imply that this is the correct synchronic treatment. In fact, since the examples in 9 involve /r/ becoming [d] and not /d/ being inserted between /r/ and /l/, I would argue that the burden of proof lies on the shoulders of linguists who want to uphold an epenthesis treatment in the synchronic phonology of Imst German.

6. The OCP Manner Constraints of Imst German.

In section 5, I demonstrated that OCP-[liquid] is a constraint of Imst German that holds across morpheme and word boundaries (and within morphemes) and has the function of triggering a change (that is, Liquid Dissimilation). In fact, OCP-[liquid] is only one of several specific OCP constraints in Imst German referring to the individual manner features in 3. In this section, I discuss the status of these feature specific OCP constraints. Section 6.1 concerns itself a case study from the history of Imst German for OCP-[continuant] and the role that constraint plays in the modern language. Section 6.2 illustrates the importance of OCP-[nasal] and OCP-[strident] in Imst German. For a similar cross-linguistic treatment relying on feature-specific OCP constraints, the reader is referred to Yip 1988.

6.1. OCP-[continuant] and Dorsal Fricative Dissimilation.

In 17a we can observe that the MHG dorsal fricative [x] shifted to IG [k] in the context before [s]. This was a very regular development in most regional varieties of High German (Schatz 1897:107). The additional examples in 17b show that MHG [x] remained before other sounds (that is, [t]). (For a more detailed analysis of examples like the ones in 17 than the one offered below, see Hall 2008.)

(17) Development of MHG [xs] and [xt] into Imst German

a. MHG [xs] > IG [ks]

MHG vu[xs]	>	IG [fuks]	‘fox’	p. 107
MHG wa[xs]en	>	IG [woksə]	‘grow’	p. 107
MHG se[xs]	>	IG [søks]	‘six’	p. 107

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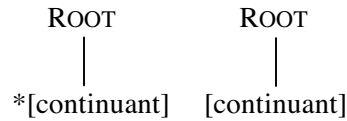
b. MHG [xt] > IG [xt]

MHG dâ[xt]	>	IG [doːxt]	'wick'	p. 123
MHG na[xt]	>	IG [noxt]	'night'	p. 138

An examination of the examples in 17a reveals that [x] and [s] can be tautosyllabic (for example, in *vu[ks]*) or heterosyllabic (for example, *wa[k.s]en*). [s] was the only fricative that could follow [x] in Middle High German and [x] was the only fricative in Middle High German that surfaced before [s]. The change in 17a only took place if the adjacent fricatives belonged to the same morpheme because the modern inflectional suffixes beginning with [s] (for example, the second person singular ending in verbs) was schwa-initial in Middle High German, that is, *-est* [əst]. According to Moser (1951:281), the change in 17a was attested in late Middle High German (for example, since the end of the 13th century in Bavarian), although some evidence suggests that it might have even begun in Old High German (OHG).

The avoidance of adjacent fricatives is due to what I see as the effects of the feature-specific OCP constraint in 18—a constraint which was active in the phonology of Middle High German, if not before. The ROOT nodes are specified as adjacent because there was no avoidance of fricatives separated by intervening sounds. According to the matrices in 3, adjacent [continuant] segments include only sequences of adjacent fricatives because no other sound is marked for that feature; hence, OCP-[continuant] only affected adjacent fricatives and nothing else.

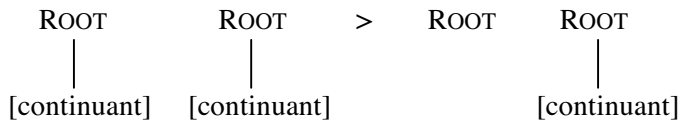
(18) OCP-[continuant] (ROOT nodes are adjacent)



I see the development in 17a as a dissimilation of the feature [continuant]—a sound change I refer to below as Dorsal Fricative Dissimilation (see 19). Dorsal Fricative Dissimilation was a neutralization because the contrast between [x] and [k] was suspended to [k] before a fricative.

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(19) Dorsal Fricative Dissimilation (ROOT nodes adjacent)



According to 19 the first of two adjacent [continuant] specifications deleted. I see this deletion as a repair mechanism (that is, 7b) when OCP-[continuant] (that is, 7a) became activated. Since [xs] was the only sequence of adjacent fricatives at this stage in the language, there is no need to specify a place of articulation for either fricative in 19.[17]

Dorsal Fricative Dissimilation simply restructured underlying representations and therefore did not have the status of a synchronic rule that was passed on to future generations. For example, when MHG [vuxs] was pronounced as [vuks], the underlying representation of this morpheme changed from /vuxs/ to /vuks/ as well. Put differently, the change in 20 did not cause alternations to arise between [x] and [k] that might motivate a synchronic rule of the form /x/ → [k] / __ /s/. In this respect, Dorsal Fricative Dissimilation was very different from Liquid Dissimilation in 12, which survives to the present day in Imst German as a synchronic rule.

Although there may be no direct evidence for the claim that Dorsal Fricative Dissimation is active as a synchronic process of Imst German, there is good reason to believe that OCP-[continuant] is retained in Imst German as a morpheme structure constraint. As in other varieties of German, Imst German allows for consonant clusters consisting of two or more obstruents. Within morphemes, these two-obstruent clusters can consist of (a) two stops, for example, *Magd* [mokt] 'maid' (p. 20); (b) a fricative and a stop, for example, *stampfen* [ʃtomfə] 'stamp' (p. 20); or

[17] My analysis is intentionally sidestepping a question that is not directly relevant for the treatment of the sound change in 17a: why did Dorsal Fricative Dissimilation change the first of the two fricatives into a stop as opposed to the second one, that is, why did [xs] not become [xt]? As Russ (1982:96) points out, there were no [ks] sequences in Middle High German that did not derive historically from [xs]. I therefore speculate that the [x] in [xs] and not the [s] dissimilated in order to fill the [ks] gap in phonotactics.

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(c) a stop and a fricative, for example, *Achsel* [okslə] (p. 18). By contrast, there are no tautomorphemic fricative-fricative sequences.[18]

6.2 On the Status of Other Manner Features.
There appears to be evidence that the other manner features of Imst German play a role in OCP related OCP constraints as well. Consider the evidence for OCP-[nasal] (that is, *[nasal] [nasal]). Like OCP-[continuant], OCP-[nasal] derives support as a morpheme structure constraint. Although adjacent tauto- and heteromorphemic sonorants can occur in Imst German (for example, *Bäumlein* [pɑ̃ːmlə] 'tree (dim.)', *warmer* [wɶrmər] 'warmer', and *Wurm* [wurm] 'worm', as mentioned above), there are no tautomorphemic sequences of adjacent nasals (for example, */mn nm nŋ ŋn/). Schatz (1897) presents occasional examples of IG words with adjacent nasals—for example, *lange mir* [loŋŋmər] 'long to me' (p. 18)—but they all appear to involve examples of two adjacent words in a syntactic phrase. However, within morphemes, Imst German does not tolerate adjacent nasals.[19]

Evidence can also be adduced for OCP-[strident]. Since the only [strident] sounds in 3 are affricates, a constraint *[strident] [strident] would derive support if adjacent affricates are avoided. This appears to be the case. As noted in section 6.1, sequences of adjacent obstruents occur with a high degree of frequency in Imst German, but these sequences involve either (a) two stops, (b) a fricative and a stop, or (c) a

[18] The reason OCP-[continuant] only holds within morphemes is that sequences of two fricatives can surface across morpheme boundaries. For example, an adjective stem ending in a fricative can surface before the superlative suffix, which begins with [ʃ]: *schlauest* [ʃlɑixʃt] 'cleverest'; see *schlau* [ʃlau] 'clever' (Schatz 1897:152). In Standard German, there are a few recent loanwords with (tautomorphemic) [sf]; for example, *Asphalt*, *Sphäre*. Assuming that these examples exist in Imst German as well, they simply show that the modern day OCP-[continuant] constraint is restricted to native words.

[19] Assuming that Standard German words like *Hymne* [hʏmnə] 'hymn', *Gymnasium* [gʏmnaːzjʊm] 'high school', and *Amnestie* [amnɛstiː] 'amnesty' all exist in Imst German, the constraint OCP-[nasal] (like OCP-[continuant]) is simply restricted to native words.

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stop and a fricative. By contrast, sequences of adjacent affricates (for example, /pfts tspf kxts tstʃ…/) do not seem to occur.[20]

In 20, I have listed the four OCP constraints for IG manner features in the first column. In the second and third columns we can observe their respective domain and the effects. OCP-[liquid] is the only one of the constraints in 20 that still maintains an active function in the sense that it triggers processes (Liquid Dissimilation and allomorphy selection in 15). It is also the only constraint with a lexical (that is, within words) and a postlexical (that is, across words) domain. The final three constraints in 20 are necessary as morpheme structure constraints (MSC) to capture phonotactic regularities.

(20) OCP manner constraints in Imst German

Constraint	*Domain*	*Effects*
OCP-[liquid]	lexical	MSC, triggers allomorphy selection
	postlexical	triggers dissimilation
OCP-[continuant]	morpheme	MSC, was once active as trigger for dissimilation
OCP-[nasal]	morpheme	MSC
OCP-[strident]	morpheme	MSC

The one manner feature in 3 not present in 20 as an OCP constraint is [lateral]. It was demonstrated in 15b above that Imst German systematically avoids adjacent laterals, but these examples were captured with OCP-[liquid]. Since OCP-[liquid] is independently necessary, it is impossible to tell whether or not Imst German also has OCP-[lateral].

7. Conclusion and Directions for Future Research.

In this article I have investigated the instability of adjacent liquids in a variety of Southern Bavarian German (Imst German). In particular, I have focused on a synchronic process, according to which /r/ surfaces as [d] before /l/ (and the reverse). This process was argued to involve a

[20] It is conceivable that the ban on adjacent affricates is only the part of a more general constraint because Imst German does not allow for affricate plus fricative or fricative plus affricate either. I leave this question open for further study.

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dissimilation of the phonological feature [liquid]. In addition to providing evidence for that distinctive feature, the present analysis also supports the model of segment structure proposed by a number of linguists (for example, Rice 1993), which replaces the traditional feature [sonorant] with the privative feature [Sonorant Voice] (SV).

While no parallel examples from either within or outside of Germanic are known to me with a similar dissimilatory process, it is interesting to note that there are languages attested that avoid sequences of /lr/ or /rl/ by assimilating one of the segments to the adjacent one. For example, according to Rice (2005:40), Toba Batak sequences like /rr ll lr/ all surface as such, but /rl/ is realized as [ll]. By contrast, according to the same source (p. 41), Hungarian /lr/ surfaces as [rr], (and /rl/ as [rl]). Given the proposal for Imst German in the present article, it is tempting to suggest that OCP-[liquid] is active in both Toba Batak and Hungarian as a rule trigger (subject to a directionality restriction). In the future one might want to investigate these and other examples of languages in which adjacent non-identical liquids are avoided in order to determine the status of OCP-[liquid].

It is also intriguing to observe that other dialects of German are attested with regular [d] ~ [r] alternations that are not triggered by an adjacent liquid. For example, Tita (1965:58–59) presents a number of examples from the Low German dialect of Bublitz (spoken in Kamnitz) illustrating the regular historical change from /d/ > /r/ in intervocalic position; for example, the [r] in Bublitz *mieten* [mɑirə] 'rent (verb)' derives from an etymological /d/. An examination of Tita's examples reveals that there are many alternations between [d] and (alveolar) [r] that support analyzing the historical process as a synchronic rule (compare *Miete* [mɑid] 'rent (noun)' vs. *mieten* [mɑirə] 'rent (verb)'; Tita 1965:48). Given the featural representations proposed above for Imst German in 6, it is not clear how to capture the change from /d/ to [r] in the environment of vowels in Bublitz in an insightful way. What the [d] ~ [r] alternations in the latter dialect therefore suggest is that the featural system for Bublitz is not the same as the one for Imst German. While IG /r/ bears SV, which dominates [liquid] and [lateral], it could be that the SV node for /r/ in the Bublitz dialect dominates only a feature also shared by vowels, for example, [approximant]; see Clements 1990 and section 3.2 above. The reason why dialects differ in their featural

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structure for segments that are the "same" (or similar) is a very general research question I leave open for further study.

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