Markedness, faithfulness and consonant place in Tashlhit roots and affixes

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MARKEDNESS, FAITHFULNESS AND CONSONANT PLACE IN TASHLHIT ROOTS AND AFFIXES

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1. INTRODUCTION

The featural composition of root consonants and affix consonants in Tashlhit exhibits a striking asymmetry. While all the phonemes of the language enter into phonemic contrasts when it comes to roots, only a subset is used in a similar fashion in affixes. The contrasts in affixes based on place of articulation are restricted to two only, labial and coronal, whereas up to four are used in roots, making the consonants permitted in roots significantly outnumber those found in affixes.

The first aim of this paper is to list different affixes in Tashlhit and look at the place specifications of their consonantal make-up. We will show that although the language has a very rich consonantal system, only a limited subset of the consonantal segments participates in the underlying constituency of the various affixes in the language. We will show that the featural asymmetry between roots and affixes is just one example of a general process of positional (specifically root) faithfulness (McCarthy and Prince, 1994, 1995; Beckman, 1997, 1998; Selkirk, 1994, 1995) by dint of which

(1) This paper contains a more profound treatment of some of the issues contained in sections in a longer and more comprehensive paper which has been circulating under the title On Root Faithfulness in Tashlhit. I would like to thank the members of the Phonology Morphology seminar group directed by A. Benhallam, namely Abdellatif Al Ghadi, Khalid Ansar, Abdelaziz Boudlal, Abdelouahed Hammari, Said Imouzaz, and Samira Rguibi, for discussing with me some of the issues contained in this paper. I would also like to thank Abderrafi Benhallam, Abdelaziz Boudlal, Samira Rguibi, Elisabeth Selkirk and Abderrahim Youssi, whose comments on form and content have contributed to making this a better paper than it would otherwise have been. As the disclaimer goes, any remaining errors of fact or analysis are my entire responsibility.
certain positions are more privileged than others. The privileged position, the root in the case under study, can fully exploit the phonological contrasts made possible by the phonology of a given language and can by the same token either trigger or resist otherwise general phonological processes. Affixes, on the contrary, tend to be relatively both less marked feature-wise and more vulnerable with respect to phonological alternations.

Investigation of root faithfulness will require consideration of some phonological processes at play in the phonology of Tashlhit, in which the relevant root segment always emerges intact, whereas the affix segment undergoes the effects of some process, which adduces support to the hypothesis underlying the analysis we propose. As a second aim of the present paper, then, we are going to explore consonant place assimilation and dissimilation in Tashlhit, processes that amply prove the privileged status of roots in comparison with affixes. We will claim that the universal ranking of root faithfulness constraints over affix faithfulness constraints proposed in Optimality Theory terms (Prince and Smolensky, 1993; McCarthy and Prince, 1993a) provides a unifying simple account of the two unrelated phenomena which have in the past been dealt with in an operational fashion and claimed to support the directionality of rule application. Ultimately, the featural asymmetry exhibited in roots and affixes and the phonological activity of assimilatory and dissimilatory phonological processes in Tashlhit will be amenable to the same analysis.

This paper is articulated as follows. Section 2 contains a summary of our theoretical assumptions concerning feature organization as well as the model in which the analysis is cast. Section 3 presents the basic facts concerning the asymmetrical behavior of place features in roots and affixes, and an analysis of the facts will be attempted in terms of constraint interaction. In section 4, we seek evidence for the proposed analysis in two phonological phenomena in the language affecting consonant place, assimilation and dissimilation. We will show how the analysis proposed in section 3 accounts without further stipulation for the phonological alternations affecting consonantal place in Tashlhit.

2. THEORETICAL ASSUMPTIONS

2.1 Feature organization

Since the seminal work of Clements (1985) in which a formal model of hierarchical feature representation is proposed, organizing the feature geometry and arguing for various groupings and sub-groupings of individual features has been of paramount importance in phonological research (Sagey,
Among the nodes that have received much attention in the literature is the place node, organizing the different places of articulation involved in consonant (and vowel) segments. In this paper, we assume that the consonant Place node has the following organization:

(1)

```
Place
 / | \  
Labial  Coronal  Dorsal
      [anterior]  [distributed]
```

Each node corresponds to the active articulator involved in the production of the sound: Labial involves the lips, coronal the front of the tongue and dorsal the body of the tongue (Clements and Hume, 1995:252).

We further assume following recent work in feature geometry (Clements and Hume, 1995; Halle, 1992, 1995) that the feature [strident] links under the root node, on the basis of the fact that place assimilation does not affect stridency (Clements and Hume, 1995:293). In addition, the feature [continuant], referring to the nature of the stricture involved in the production of the sound, is assumed here to depend directly of the root node (Halle, 1992, 1995; McCarthy, 1988, 1994; Sagey, 1986). We will also make use of the Guttural node (Halle, 1995:17), under which appear the non-place articulators (Larynx and Tongue Root) and which characterizes the set of sounds with a back articulation, i.e. laryngeals, pharyngeals and uvulars.

2.2 Optimality Theory

Departing from SPE phonology (Chomsky and Halle, 1968), OT (Prince and Smolensky, 1993 and related works; see Kager, 1999 for a textbook treatment) embodies a new conception of Input-Output relation. Instead of assuming that the relation of the input to the phonological component and its output is governed by the application of a set of serially ordered rules, OT claims that the relation is rather governed by the interaction
of potentially violable universal constraints on output well-formedness. In OT, the grammar has the following organization:

(2)

\[
\begin{align*}
\text{INPUT} & \quad \downarrow \\
\text{GEN} & \quad \downarrow \\
\{\text{Cand}_1, \text{Cand}_2, \ldots, \text{Cand}_n\} & \quad \downarrow \\
\text{EVAL} & \quad \downarrow \\
\text{OUTPUT} &
\end{align*}
\]

Gen, claimed to be part of Universal Grammar and to have access to the primitives of phonological representation, generates for a given input an infinite set of candidate analyses \{\text{Cand}_1, \text{Cand}_2, \ldots, \text{Cand}_n\}, whose well-formedness Eval assesses against a hierarchy of constraints Con in a parallel and inclusive fashion. The candidate which best satisfies Con (or equivalently that incurs minimal violations of the constraints) is the optimal candidate.

The constraints of Con are universal and have a general formulation. The task of the linguist is to find out which constraints belong to the grammar of the language under study and to rank them on a language-particular basis. Different kinds of constraints have been investigated. For example, markedness constraints assess the featural, segmental, and prosodic well-formedness of candidates associated with the input, while faithfulness constraints assess the extent to which the input and output correspond. These two sets of constraints impose conflicting requirements of well-formedness. If the grammar did not contain faithfulness constraints, underlying contrasts will be neutralized and all inputs will consequently emerge in the unmarked form.

(2) Alignment constraints regulating the coincidence of different prosodic and morphological edges have also been investigated (cf. McCarthy and Prince (1993b) for various alignment constraints). We do not include these here as they play no role in the analyses proposed later in this paper.
Constraints in OT can be ranked with respect to one another in two different ways. If constraint A provably dominates constraint B, then we have a case of direct ranking. If constraint A dominates constraint B, and constraint B dominates constraint C, then by transitivity, A dominates C. This is a case of indirect ranking. To visualize the different interactions between the different constraints on output well-formedness as well as the way the optimality of a given candidate is determined, OT uses the constraint tableau method. The following is an example:

\begin{tabular}{|c|c|c|c|}
\hline
Input: X & A & B & C \\
\hline
\hline
\textbullet{} Cand_1 & & * & \\
\hline
Cand_2 & *! & & \\
\hline
Cand_3 & *! & & * \\
\hline
\end{tabular}

The input X is given at the top of the left-hand column and the candidate set generated by Gen appears underneath the input. The constraint hierarchy is represented in the top row, where the constraint on the left is higher in the hierarchy than the one(s) to its right. A solid line (\textbullet{}) separating the constraints indicates hierarchical order (in the text the symbol "\textunderscore{}\textgreater{}\textgreater{}" expresses the domination relation, hence A\textunderscore{}\textgreater{}\textgreater{}B means "constraint A dominates constraint B"). If no hierarchical dominance relation can be established between two constraints, these are separated by a dotted line (\textbullet{}) (in the text we simply separate the two constraints in question by a comma, B, C). The star (**") indicates violation of a constraint, and the exclamation mark in front of the star (**!) fatal violation. A cell left blank shows that the candidate has not incurred any violation(s) of the constraint in question. The optimal candidate is pointed at by the symbol "\textbullet{}".

In the present paper, we will specifically be assuming the framework of Correspondence Theory as laid out in McCarthy and Prince (1995). Correspondence is defined as follows:

\begin{equation}
\text{Given two strings } S_1 \text{ and } S_2, \text{ Correspondence is a relation } R \text{ from the elements of } S_1 \text{ to those of } S_2. \text{ Element } \alpha \in S_1 \text{ and } \beta \in S_2 \text{ are referred to as correspondents of one another when } \alpha R \beta.
\end{equation}

Since the present paper focuses on place features in consonant segments, we will be using the correspondence constraint IDENT(F), requiring identity between input feature specifications and output ones, formalized in McCarthy and Prince (1995) as follows:
2.3. Positional faithfulness

McCarthy and Prince (1994:A28) state that there is a striking asymmetry between roots and affixes, with affixes being more subject to size and weight requirements and being syllabically or segmentally less marked than roots. They later propose (McCarthy and Prince, 1995) that this behavior shows that root faithfulness constraints are more observed than affix faithfulness constraints, which argues for the ranking Root Faithfulness >>Affix Faithfulness (RF>>AF).

Beckman (1998) argues that RF>>AF is just one of the different instantiations of positional faithfulness. According to her, three phenomena are induced by positional faithfulness. First, certain phonological contrasts are neutralized in some positions. Thus, roots, for example, may exhibit a wider array of phonological contrasts than may affixes. Second, there are positionally motivated phonological processes. For example, assimilation may be triggered by root segments but not by affix segments. Third, an otherwise general phonological process may meet with resistance from structures in privileged positions, the resistance of root segments to various phonological processes being a case in point.

Positional faithfulness is largely accounted for in terms of the interaction of different faithfulness constraints. A more specific constraint is needed that requires the faithfulness of elements which occupy privileged positions (Beckman, 1998:9) (in the present context IDENT-Position (F) can be more precisely expressed as IDENT-Root (F)).

(6) IDENT-Position (F):

Let $\beta$ be an output segment in a privileged position $P$ and $\alpha$ the input correspondent of $\beta$. If $\beta$ is $[\gamma F]$, then $\alpha$ must be $[\gamma F]$.

"Correspondent segments in a privileged position must have identical specifications for $[F]$.”

Citing Selkirk (1994), Beckman proposes an account for positional faithfulness consisting in ranking the specific constraint IDENT-Position(F) relatively higher in the hierarchy than the general constraint governing non-privileged position faithfulness IDENT(F), with the possibility of there being markedness constraints (C) intervening between the two faithfulness
constraints. The ranking schema accounting for the various effects of positional faithfulness phenomena is:

(7) **Ranking schema for positional phonological asymmetries** (Beckman, 1998:9):

\[
\text{IDENT-Position (F)} \gg \text{C} \gg \text{IDENT(F)}.
\]

In the remainder of this paper, we will show that an elegant analysis of the asymmetrical featural constituency of Tashlhit roots and affixes, together with phonological processes affecting affix consonants and sparing root consonants, is made possible along the premises of positional faithfulness.

### 3. ROOT AND AFFIX IN TASHLHIT: THE BASIC ASYMMETRY

#### 3.1 Place in Tashlhit roots

The table in (8) is the consonantal chart of Tashlhit (worked out from the work of Boukous (1982, 1987, 1989/1990)), where place is represented horizontally and stricture vertically:

(8) **The consonantal system of Tashlhit**

<table>
<thead>
<tr>
<th></th>
<th>Labials</th>
<th>Coronals</th>
<th>Dorsals</th>
<th>Gutturals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stops</strong></td>
<td>b</td>
<td>t, d, T, D</td>
<td>k, g, kʷ, gʷ</td>
<td>q, qʷ</td>
</tr>
<tr>
<td><strong>Fricatives</strong></td>
<td>f</td>
<td>s, z, S, Z, Š, Ž</td>
<td>x, γ, xʷ, γʷ</td>
<td>i, ų, h</td>
</tr>
<tr>
<td><strong>Sonorants</strong></td>
<td>m</td>
<td>n, l, r, L, R</td>
<td>Š, Ž</td>
<td></td>
</tr>
<tr>
<td><strong>Glides</strong></td>
<td>w</td>
<td>j</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tashlhit roots may contain any one of the consonantal segments in the

---

(3) The transcription symbols used in this paper have the standard IPA values, except for the following: Š and Ž stand the voiceless and voiced palatal fricatives, respectively, and Š and Ž are their emphatic counterparts. Š is the voiced pharyngeal fricative. All other emphatic segments are represented here by a corresponding capital letter.

(4) The phonemicity of the segments in the chart in (8) is established in previous works on Tashlhit phonology (Boukous, 1982; Elmorjajhki, 1979; Elmedlaoui, 1985). It should be noted that almost all of the consonantal elements of Tashlhit have a geminate counterpart (Boukous, 1982).

(5) The notion of 'root' as used in early studies of Berber in general is borrowed from Semitic studies and applied to the facts of the language. Much controversy characterized the use of the notion root. Basset (1929, 1952), for example, claims that the root in Berber consists of consonantal elements only, while the vowels all have a morphological value. This idea is strongly criticized by later scholars of the language, who all claim that the root should
language inventory. The point we are making here is simply that the phonemic content of Tashlhit roots is totally unrestricted with respect to the total Tashlhit segmental inventory, since practically each single consonant in the chart is a potential radical element. Restricting the contrasts to place only, we propose the following generalization:

(9) **Place features**

Tashlhit roots may contain consonants articulated at each of the following places: Coronal, Labial, Dorsal and Guttural.

This observation will constitute the basis of the claim that root faithfulness should outrank the place markedness constraints of the language. The affixes of the language, as will be shown in section 3.2, are not as privileged.

We assume as provisionally correct that the place markedness constraints at play in the language together with their ranking are the ones listed in (10):

(10) **Place markedness constraints in Tashlhit**:

(i) Place markedness constraints:

*CORONAL (*COR): Coronal place is banned.
*LABIAL (*LAB): Labial place is banned.
*DORSAL (*DOR): Dorsal place is banned.
*GUTTURAL (*GUT): Guttural place is banned.

(ii) Ranking:

*GUT, *DOR>>*LAB>>*COR.

consist of vowels in addition to consonants; otherwise, it will be next to impossible to provide a morphological affiliation to some of the vowels. Thus, Jebbour (1988), Iazzi (1991) and Bensoukas (1994), among others, argue that the lexical entries of Berber verb roots should include both vocalic and consonantal elements. It should thus be made clear right from the outset that the notion 'root' is used in the present context in a different way from the traditional scholarship of Berber.

(6) The Tashlhit vowel system includes only three underlying vowels, i, u and a, which may get further specifications as a result of emphasis assimilation. See the discussion of this point in Boukous (1987).

(7) Although in some representations in the literature on feature geometry Guttural is not included under place (see McCarthy (1994), however), we are listing it with the place features of consonants simply to show that all consonant types in Tashlhit are permitted in roots. It is only for the sake of inclusiveness that we have also included guttural in the top row in the chart (8) representing place features in consonants, to show that even gutturals are allowed in roots. Later in the analysis, we will restrict our discussion to Coronal, Labial and Dorsal places only. Inclusion or omission of the guttural node has no bearing on our analysis and should in no way be given any theoretical interpretations.

(8) The fact that Guttural features are allowed in Tashlhit roots and not in affixes suggests ranking the markedness constraint *Guttural below IDENT-Root(F) and above IDENT(F). We have been unable to find evidence for ranking *Guttural and *Dorsal with respect to one another.
In order to allow the full featural contrasts found in roots, the place markedness constraints (9) must be ordered lower than the root faithfulness constraint of the language. The general schema is the following:

(11) **Place features in Tashlhit roots:**

\[
\text{IDENT-Root(F)} \gg *\text{GUT}, *\text{DOR} \gg *\text{LAB} \gg *\text{COR}.
\]

The fact that all place markedness constraints are dominated by IDENT-Root(F), as in (11), ensures that any markedness constraint outranked by IDENT-Root(F) may be violated by faithful candidates without this violation making them sub-optimal.

Consider, for example, the item \textit{mgr} ‘harvest’. The consonantal place features involved in the specification of this verb are respectively [labial], [dorsal] and [coronal]. Although the constraints on place markedness are present in the grammar of Tashlhit, the output form of \textit{mgr} still contains all three places, due to the fact that markedness is outranked by root faithfulness. Consider tableau (12) in which is assessed the well-formedness of the output \textit{mgr} as well as that of much less featurally marked candidates:

(12) **IDENT-Root(F)>>Place markedness: all place features are possible in roots:**

<table>
<thead>
<tr>
<th>Input: \textit{mgr}</th>
<th>IDENT-R (F)</th>
<th>*DOR</th>
<th>*LAB</th>
<th>*COR</th>
</tr>
</thead>
<tbody>
<tr>
<td>a- ttt</td>
<td>***!</td>
<td></td>
<td></td>
<td>***</td>
</tr>
<tr>
<td>b- tgr</td>
<td>*!</td>
<td>*</td>
<td></td>
<td>**</td>
</tr>
<tr>
<td>c- mgt</td>
<td>*!</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>d- ktr</td>
<td>**!</td>
<td>*</td>
<td></td>
<td>**</td>
</tr>
<tr>
<td>e- mgr</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

Candidates might be multiplied to infinity (10) just by operating various combinations of feature specifications. However, on the basis of the ranking established, none, including the least marked candidate (12a) ttt, will see its way to the surface except the totally faithful candidate (12e) which incurs no

---

(9) Complex consonants are also allowed in Tashlhit roots, namely the round velar consonants (see (8)). This suggests that the faithfulness constraint IDENT-Root(F) has to dominate the markedness constraint against such complex segments.

(10) A candidate we are not considering in tableau (12) and which contains a consonant with labial place is \textit{fgr}. Being on the basis of place faithfulness as well-formed as optimal \textit{mgr}, this candidate constitutes a challenge for the constraint ranking as it stands, but it should be obvious that this candidate will be judged suboptimal on the basis of its violating stricture faithfulness constraints we are not including in the tableau. From now on, we will consider in tableaux candidates with different place features only, whereas candidates violating other constraints, stricture or other, will be ignored.
IDENT-Root(F) violations, despite its incurring a violation mark of each and every featural markedness constraint. Thus, the surfacing of marked place features in roots is indicative of the fact that feature markedness constraints are dominated by RF, which ensures that all input features have identical correspondents in the output, irrespective of the place markedness violations they incur.

It should come out as obvious that if we change the order of the constraints on faithfulness and markedness, different results will be obtained:

(13) Place markedness >> IDENT-Root(F): banning marked place features in roots:

<table>
<thead>
<tr>
<th>Input: mqr</th>
<th>* DOR</th>
<th>* LAB</th>
<th>* COR</th>
<th>*IDENT-R (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>☹ a- ttt</td>
<td>*1</td>
<td>*1</td>
<td>**</td>
<td>***</td>
</tr>
<tr>
<td>b- tgr</td>
<td></td>
<td></td>
<td></td>
<td>***</td>
</tr>
<tr>
<td>c- mtr</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>d- mgr</td>
<td>*1</td>
<td>*!</td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

The symbol “☹” indicates that the winner in tableau (13) is not the attested output form in the language. The re-ranking of markedness over faithfulness, as predicted, yields only unmarked structures. Recall our observation above that if it were not for faithfulness constraints, only unmarked structure will emerge. Tableau (13) clearly illustrates this observation.

3.2 Place in Tashlhit affixes

We start this section with a quote from Marcy (1931:56), from which certain portions have been omitted:

Les affixes qui possèdent en berbère une fonction grammaticale définie se caractérisent par certains traits essentiels qu’il convient dès l’abord de bien préciser.
En premier lieu, ce sont toujours des consonnes: dentales, sifflantes ou nasales...Les mêmes affixes servent...à la formation des noms et des verbes- tels le préfixe s commun au factitif verbal et au noms d’instruments, ou encore le préfixe m usité à

(11) We will not deal with the exhaustive list of affixes in the language. Among the unlisted ones is the plural morpheme. The consonantal content of the mostly used plural affix {ι-...-n} does not differ much from the featural content of the affixes illustrated in this section. For a detailed study of plural formation in Tashlhit, see Jebbour (1988) and Lasri (1991). Jebbour (1996) also contains a treatment of specific issues related to plural formation.
la fois pour les verbes de réciprocité et les noms d'état ou d'agents...l'élément t, tout en même temps indice de passif, d'intensif, de féminin, de collectif, de nom d'unité, et thème pronominal des deuxième et troisième personnes.

This statement, though originally formulated by Marcy for a totally different reason, simply proves that even in the very early periods of Berber studies, the simplicity of the affixal feature constitution was remarkable, a remark made by Basset (1952:12), too, with respect to verbal roots:

Le verbe comprend une forme simple et des formes dérivées. La dérivation peut être obtenue...par l'addition de préfixes à base consonantique, ainsi, à base sifflante, à base dentale, à base nasale, ce qui représente les trois formes vivantes de dérivation, la première à valeur factitive, la seconde à valeur passive, la troisième soit à valeur réciproque soit à valeur passive, selon les verbes.

To reinterpret Marcy's and Basset's statements in our terms, the place featural make-up of affixes is restricted only to the labial and coronal nodes on the feature geometric tree.

This should be interpreted as ensuing from the ranking of AF (represented here by the general faithfulness constraint IDENT(F)), ensuring faithfulness of output to input, between the place markedness constraints as in (14). To allow for affixes containing Coronal and Labial features, IDENT(F) must dominate the markedness constraints *LAB and *COR; to exclude dorsal features, IDENT(F) must be dominated by the markedness constraint *DOR. Given this ranking, no affix will emerge, with the marked featural content Dorsal. The general schema of the ranking is as follows:

(14) Place features in Tashlhit affixes:

* DOR >> IDENT(F) >> * LAB >> * COR.

In the following subsections, we will consider one affix at a time, and its featural composition will be assessed against the ranking in (14).

3.2.1 Coronal affixes

The set of affixes whose place is specified as Coronal can be subdivided into two groups depending on the constriction type involved, namely stop or fricative. We will consider in this section the following morphemes: the verb imperfective {tt-}, the passive {ttu-}, the feminine {t-...t}, the causative {ss-}, and the instrument/location {s-}.
To start with, the imperfective form in Tashlhit, an aspectual form of the verb (Basset, 1929; Derkaoui, 1986; Dell and Elmediaoui, 1991; Iazzi, 1991), is derived by \{tt-\} prefixation. It can take on different temporal values expressed by accompanying particles or temporal adverbs. Examples are, where the imperfective morpheme is written in bold (from now on the first column of the data corresponds to the imperative form of the verb and the second column to the derived form under discussion):

(15) **Inflectional affixation: Verb imperfective form:**

<table>
<thead>
<tr>
<th>g</th>
<th>tt-gga</th>
<th>be</th>
</tr>
</thead>
<tbody>
<tr>
<td>af</td>
<td>tt-af</td>
<td>be better than</td>
</tr>
<tr>
<td>ak-'i</td>
<td>tt-ak-'i</td>
<td>jump</td>
</tr>
<tr>
<td>ffγ</td>
<td>tt-ffγ</td>
<td>go out</td>
</tr>
<tr>
<td>mun</td>
<td>tt-mun</td>
<td>accompany</td>
</tr>
<tr>
<td>ajwul</td>
<td>tt-ajwul</td>
<td>float</td>
</tr>
</tbody>
</table>

The second category we will consider is the Tashlhit passive form, derived by the prefixation of one of the variants [ttu-] or [ttj-] to the verb form (see Moktadir (1989) for a complete study of the passive from the perspective of Prosodic Morphology (McCarthy and Prince, 1986); see also the recent treatment in Jebbour (1996)):

(16) **Derivational affixation: Passive forms:**

| sli  | ttu-slaaj | touch     |

---

(12) The imperfective form in Tashlhit is derived by different means: tt-prefixation, internal gemination, and vowel epenthesis. Whether these are to be considered as morphological processes or prosodic ones, or even variants of one another, is a difficult issue to settle. We will be focusing in this paper on the prefixation of tt-, since it is the only affixal process involved in imperfective formation.

(13) A third variant ttaw- is also attested. Considering the allomorphy affecting the passive morpheme in Tashlhit is beyond the scope of the present paper, since focus here is rather on the featural contrasts present in roots and those present in affixes. The allomorphy affecting the passive morpheme is not significant in this respect. For proposals, see Moktadir (1989) and Jebbour (1996).

(14) The status of the prefinal vowel in passive forms, and for that matter in imperfective forms and nominal forms, is controversial. Two trends can be discerned in the literature. The first defends the lexical hypothesis by virtue of which the vowel is part of the nonconcatenative morpheme involved in the formation of the form in question (Moktadir, 1989; Iazzi, 1991; Anasse, 1994). The second approach defends the hypothesis that the prefinal vowel is an epenthetic element (Bensoukas, 1994; Jebbour, 1996). In the remainder of this paper, the underlying forms will be given without the prefinal vowel, whereas the candidates whose well-formedness is to be assessed will display it.
Also involving a coronal place specification is the inflectional nominal morpheme of the feminine. It is a circumfix {t-...-t), the featural unmarkedness of which is worth noting for the sake of the present discussion:

(17) *Inflectional affixation: feminine nouns*:

- a-frux t-a-frux-t girl
- a-funas t-a-funas-t cow
- a-glzim t-a-glzim-t axe
- a-gzzum t-a-gzzum-t piece

The fourth category considered involves a coronal fricative. The causative form of the verb in Tashlhit is derived by the prefixation of a voiceless geminate coronal fricative {ss-}, which is subject to three different alternations, affecting its quantity, voicing and place. First is the geminate/simple alternation (18i-ii) treated in Jebbour (1996) and references therein. Second, the reciprocal morpheme is subject to an assimilation process affecting its voicing (18iii), its place of articulation (18iv), or both (18v) (Boukous, 1987; Lasri, 1991; Elmedlaoui, 1992.). In this paper, we restrict our attention to the place of articulation of the consonant morpheme, which we will treat in further detail in section 4.1:

(18) *Derivational affixation: Causative forms*:

1. ns ss-ns spend the night
2. ajl ss-ajl fly
3. mun s-mun accompany
4. nz zz-nz sell
5. izwir zz-izwir go first
6. ašk řš-ašk come
7. Ršm řš-Ršm ornament
8. žžu ř-užžu have a good scent
9. mmžžgr ř-mmžžgr be not totally closed (of a door)
Similar in place specification is the last morpheme we sketch here, the one used in the derivation of instrument and place nouns. Feature-wise, this consists of a simple voiceless coronal fricative s. The examples in (19) illustrate this class of noun:

(19) Derivational affixation: Tashlhit instrument/location nouns:

\[
\begin{array}{lll}
\text{krf} & \text{a-s-krf} & \text{tie} \\
\text{krz} & \text{a-s-krz} & \text{plow} \\
\text{gnu} & \text{i-ss-gni} & \text{sew} \\
\text{gg*z} & \text{a-z-uggz} & \text{descend}
\end{array}
\]

The instrument/location affix may be subject to the same quantity and voicing alternations exhibited by the causative prefix. We do not pursue this fact here for lack of sufficient data.

The analysis we will propose rests heavily on the interaction of faithfulness and markedness constraints. The fact that the coronal place feature is allowed in the affixes considered so far suggests that the markedness constraint *COR should be dominated by the general faithfulness constraint IDENT(F). On the contrary, since the dorsal place features are not allowed in Tashlhit affixes, the markedness constraint *DOR banning any occurrence of the dorsal place node should dominate the faithfulness constraint so that no dorsal consonant will ever see its way to surface affixal structure. In tableau (20), the labial place markedness constraint *LAB, along with *COR, is dominated by IDENT(F) showing that in principle both labial (which is true of reciprocal formation and agentive noun formation in section 3.2.2) and coronal places are permitted in affixes (for the sake of clarity, the verb gawr (sit) is listed after each candidate analysis of the underlying morpheme in (20), but the markedness of its features is not assessed):

(20) Imperfective morpheme:

\[
\begin{array}{c|cccc}
\text{Input: Imperf. anti-} & \text{a-} & \text{kk-gawar} & \text{IDENT(F)} & \text{LAB} & \text{COR} \\
\text{b-} & \text{tt-gawar} & \text{!*} & \text{!} & \text{!} & \text{!} \\
\text{c-} & \text{ff-gawar} & \text{!*} & \text{!*} & \text{!}
\end{array}
\]

The candidate (20b) tt-gawar emerges as the optimal candidate. All of the remaining competitors lose. (20a) kk-gawar is out because it violates a higher

---

(15) Tashlhit nouns have an initial vowel which is an inflectional morpheme indicating number. In feminine nouns, it is inner to the prefixal part of the feminine morpheme {t...t}.
order constraint that neither of the remaining candidates violates. The challenger (20c) ff-gawr fails in front of tt-gawr by virtue of the latter containing identical coronal specifications in both input and output, while the former is unfaithful to the input.

The unmarkedness of the featural specification of the passive morpheme’s consonantal constituent, especially its place specification, can be accounted for without further ado. Consider tableau (21), in which the place markedness of the passive morpheme is assessed on the basis of the ranking *DOR>>IDENT(F)>>*LAB>>*COR developed so far (in (21) the verb krz (plow) is listed after the candidates for ease of exposition, but its features are not assessed):

(21) Passive morpheme:

<table>
<thead>
<tr>
<th>Input: Pass. ttu-</th>
<th>* DOR</th>
<th>IDENT(F)</th>
<th>* LAB</th>
<th>* COR</th>
</tr>
</thead>
<tbody>
<tr>
<td>a- mmu-kraz</td>
<td></td>
<td>*!</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b- ttu-kraz</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>c- kku-kraz</td>
<td>*!</td>
<td></td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

Candidate (21c) kku-kraz is out of the competition as it violates the high ranked *DOR. The two remaining competitors are assessed as to their faithfulness. Both of them contain a feature that is licit in Tashlhit affixes as is shown by the domination IDENT(F)>>*LAB>>*COR, but only the candidate (21b) ttu-kraz, satisfying IDENT(F), is judged optimal.

The same analysis covers the remaining categories, for which we provide constraint tableaux only, the remarks being largely similar to the ones made for (20) and (21) (again only the place features of affixes are assessed):

(22) Feminine morpheme:

<table>
<thead>
<tr>
<th>Input: Fem t-...-t</th>
<th>* DOR</th>
<th>IDENT(F)</th>
<th>* LAB</th>
<th>* COR</th>
</tr>
</thead>
<tbody>
<tr>
<td>a- m-afunas-m</td>
<td></td>
<td>**!</td>
<td>**</td>
<td></td>
</tr>
<tr>
<td>b- k-a-funas-k</td>
<td>**!</td>
<td>**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c- t-a-funas-t</td>
<td>**!</td>
<td>**</td>
<td></td>
<td>**</td>
</tr>
</tbody>
</table>

(23) Causative morpheme:

<table>
<thead>
<tr>
<th>Input: Caus ss-</th>
<th>* DOR</th>
<th>IDENT(F)</th>
<th>* LAB</th>
<th>* COR</th>
</tr>
</thead>
<tbody>
<tr>
<td>a- m-gawr</td>
<td></td>
<td>*!</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b- s-gawr</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>c- k-gawr</td>
<td>*!</td>
<td></td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>
We are on familiar territory again. Only the candidates faithful to the underlying featural specifications are optimal, conforming to the basic unmarkedness pattern of affixes in Tashlhit. This closes the discussion of the various coronal affixes of Tashlhit, whose featural specifications are governed by the ranking C>>IDENT(F)>>C. In the next section, we will consider labial affixes.

### 3.2.2 Labial affixes

There are two affixes in Tashlhit whose place specification is labial. First, we consider the reciprocal form of the verb, which is derived by prefixing the primary labial consonant m- to a verbal base (25i). The prefix is subject to a delabializing process when the base contains a labial consonant as in (25ii):

(25) Derivational affixation: Reciprocal forms:

<table>
<thead>
<tr>
<th>(i)</th>
<th>(ii)</th>
</tr>
</thead>
<tbody>
<tr>
<td>εawn</td>
<td>sllm</td>
</tr>
<tr>
<td>rg</td>
<td>fts</td>
</tr>
<tr>
<td>ḫada</td>
<td>n-fattas</td>
</tr>
<tr>
<td>n-sallam</td>
<td>n-xfubbu</td>
</tr>
<tr>
<td>m-ḥada</td>
<td>n-xalaf</td>
</tr>
<tr>
<td>m-awm</td>
<td>n-fattas</td>
</tr>
<tr>
<td>tafmm</td>
<td>n-fattas</td>
</tr>
</tbody>
</table>

Second, the agentive noun in Tashlhit is a nominal category that refers to the doer of the action expressed by the corresponding verb (see the relatively elaborate treatment of this nominal type in Bensoukas (1994); an analysis within a general perspective is presented in Anasse (1994)). The agentive noun morpheme is argued in Bensoukas (1994) to consist underlyingly of the labial consonant /m-/ (26i), which in (26ii) is subject to a delabialization process identical to the one exhibited by the reciprocal morpheme in (25ii):

<table>
<thead>
<tr>
<th>Input: Instr. s.</th>
<th>* DOR</th>
<th>IDENT(F)</th>
<th>* LAB</th>
<th>* COR</th>
</tr>
</thead>
<tbody>
<tr>
<td>a- a-m-krf</td>
<td></td>
<td>*!</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>b- a-k-krf</td>
<td>*!</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c- a-s-krf</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>
(26) Derivational affixation: Agentive noun:

(i)  
krz  a-m-kraz  plow
hDr  a-m-hDDr  play
ags  a-m-agus  injure
kkusu  i-m-kkisi  inherit

(ii)  
mgr  a-n-mgar  harvest
frn  a-n-fran  sort out
g'mr  a-n-g'mar  hunt
Dfr  a-n-Dfur  follow

The featural composition of the reciprocal and agentive morphemes is again one of the simplest. It emanates from the same ranking *DOR>>IDENT(F)>>*LAB>> *COR as has been assumed so far (the delabialization affecting the reciprocal and the agentive morphemes is not considered here, but will rather be postponed to section 4.2):

(27) Reciprocal morpheme:

<table>
<thead>
<tr>
<th>Input: Recip. m-</th>
<th>* DOR</th>
<th>IDENT(F)</th>
<th>* LAB</th>
<th>* COR</th>
</tr>
</thead>
<tbody>
<tr>
<td>a- k-ξawn</td>
<td>*!</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b- m-ξawn</td>
<td></td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>c- s-ξawn</td>
<td>*!</td>
<td>*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The optimal candidate (27b) wins against the challenger (27c), the least marked of the three, by virtue of (27b) m-ξawn being faithful to the input. The third candidate (27a) is excluded on the basis of its violating a higher order markedness constraint, *DOR. What emerges from considering the facts of the reciprocal is that the more marked dorsal place is totally absent from the domain of affixal specifications by virtue of the markedness constraint *DOR dominating the general faithfulness constraint IDENT(F).

Let's now consider the agentive noun morpheme. The analysis proposed aligns it with the general picture presented so far and in which the ranking *DOR>>IDENT(F)>>*LAB>>*COR plays a crucial explanatory role:

(28) Agentive noun morpheme:

<table>
<thead>
<tr>
<th>Input: Ag.n. m-</th>
<th>* DOR</th>
<th>IDENT(F)</th>
<th>* LAB</th>
<th>* COR</th>
</tr>
</thead>
<tbody>
<tr>
<td>a- a-s-kraz</td>
<td></td>
<td>*!</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>b- a-m-kraz</td>
<td></td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>c- a-k-kraz</td>
<td>*!</td>
<td>*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Candidate (28c) with the dorsal place \((a-k-kraz)\) is suboptimal as it violates a higher order constraint. At the other extreme lies the least marked candidate, the one consisting of the coronal place (28a) \((a-s-kraz)\). Although it violates the lowest ranked markedness constraint \(^*\text{COR}\), it fares worse than candidate (28b) on the \text{IDENT}(F)\) constraint. Once more, the featural contrasts in Tashlhit affixes are relatively unmarked due to the effect of ranking some markedness constraint higher in the hierarchy than the general faithfulness constraint \text{IDENT}(F)\).

To sum up, the following table shows the asymmetries exhibited by the featural contrasts at play in roots and affixes:

(29) \textit{Place features in Tashlhit roots and affixes:}

<table>
<thead>
<tr>
<th>Place</th>
<th>Coronal</th>
<th>Labial</th>
<th>Dorsal</th>
<th>Guttural</th>
</tr>
</thead>
<tbody>
<tr>
<td>\textit{Roots}</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>\textit{Affixes}</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

The fact emerges from (29) that the more marked a place feature, the more unlikely it is to be found in Tashlhit affixes. No such a constraint seems to weigh on the root segments, allowing all the place features possible in the language.

3.2.3 \textit{Inflectional verbal affixes: A residual problem}

There are non-root morphemes that have in terms of the place contrasts they allow an inventory intermediary between the derivational affixes discussed so far and the root morphemes. Referred to in the literature on Berber linguistics as verbal clitics (Dell and Elmedlaoui, 1989:169) or simply verbal affixes (Galand, 1988:236), these bound morphemes express information relating to grammatical person, number, and gender. Their suppression “mutilates” the verbal form to which they are integrated (Galand, 1988). The following list contains two representative types of such affixes, along with the conjugated forms of the verb \textit{ut} (hit):

\begin{itemize}
\item In terms of their morpho-syntactic behavior, the bound inflectional verbal morphemes share certain affinities with the autonomous personal pronouns \textit{nkk\((in)\) “1/me”, kij\((in)\) “you, sg. masc.”, k\(min\)\((m)\) “you, sg. fem.”, n\(ta\)\((n)\) “he/him”, n\(ttat\) “she/her”, n\(kk\)\(ni\) “we/us, masc.”, n\(kk\)\(m\)\(ni\) “we/us, fem.”, k\(\nu\)\(ni\) “you, pl. masc.”, k\(\nu\)\(m\)\(minti\) “you, pl. fem.”, n\(\nu\)\(ti\) “they/them, masc.”, and n\(\nu\)\(t\)\(ti\) “they/them, fem.” (Galand, 1988:232). The place contrasts these affixes utilize turn out to be marked with respect to the ones at play in the other affixes considered in the present paper.
\end{itemize}
Some of them containing the very marked place specifications [dorsal] and [guttural], the affixes listed in (30) represent a challenge to the current treatment of the root-affix asymmetry in terms of place.

A fact to be mentioned with respect to the affixes in (30) is that their phonological behavior clearly distinguishes them from the affixes discussed in sections 3.2.1 and 3.2.2. These lie outside the domain of labial dissimilation (Selkirk, 1995) (see section 4.1). As our analysis stands, we do not have any ready explanation for why this type of affixes should (i) allow more contrasts based on place and (ii) resist the otherwise general process of labial dissimilation. Probably a more sophisticated appeal to morphology is required to account for this fuller array of facts.

The suggestion we make for treatment of these, but which we do not pursue here, is based on the explanation Selkirk (1995) provides for the particular behavior of this type of affixes, which is cast in terms of domain theory. The constraint responsible for labial dissimilation holds only in the root and stem domains, but not in the word domain. This idea is implemented by proposing different markedness constraints each holding at a specified domain (for example, OCP_{root}, OCP_{stem}, and OCP_{word}). Assuming the correctness of this analysis, we suggest that the two types of affix faithfulness constraints exist. These interact in a different manner with markedness constraints: First, stem affix faithfulness is dominated by the markedness constraints *GUTTURAL and *DORSAL, so that stem affixes are unmarked, as discussed in sections 3.2.1 and 3.2.2; second, there are word

---

(30) **Tashlhit person/number/gender verbal affixes**

<table>
<thead>
<tr>
<th>Person</th>
<th>Nominative pronouns</th>
<th>Objective pronouns</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>\textit{ut-γ/x/κ}</td>
<td>'I hit'</td>
</tr>
<tr>
<td></td>
<td>\textit{i-ut-iji}</td>
<td>'He hit me'</td>
</tr>
<tr>
<td>2nd</td>
<td>\textit{t-t}</td>
<td>'You hit'</td>
</tr>
<tr>
<td></td>
<td>\textit{i-ut-k}</td>
<td>'He hit you'</td>
</tr>
<tr>
<td>3rd</td>
<td>\textit{i-ut}</td>
<td>'He hit'</td>
</tr>
<tr>
<td></td>
<td>\textit{i-ut-t}</td>
<td>'He hit him'</td>
</tr>
<tr>
<td>3rd</td>
<td>\textit{t-t}</td>
<td>'She hit'</td>
</tr>
<tr>
<td></td>
<td>\textit{i-ut-stt}</td>
<td>'He hit her'</td>
</tr>
<tr>
<td>1st</td>
<td>\textit{n-ut}</td>
<td>'We hit'</td>
</tr>
<tr>
<td></td>
<td>\textit{i-ut-ay/ax/ακ}</td>
<td>'He hit us'</td>
</tr>
<tr>
<td>2nd</td>
<td>\textit{t-ut-m}</td>
<td>'You hit'</td>
</tr>
<tr>
<td></td>
<td>\textit{i-ut-k*κ}</td>
<td>'He hit you'</td>
</tr>
<tr>
<td>3rd</td>
<td>\textit{t-ut-κ}</td>
<td>'You hit'</td>
</tr>
<tr>
<td></td>
<td>\textit{i-ut-k*κnt}</td>
<td>'He hit you'</td>
</tr>
<tr>
<td>3rd</td>
<td>\textit{u-t}</td>
<td>'They hit'</td>
</tr>
<tr>
<td></td>
<td>\textit{i-ut-tcn}</td>
<td>'He hit them'</td>
</tr>
<tr>
<td>3rd</td>
<td>\textit{u-tnt}</td>
<td>'They hit'</td>
</tr>
<tr>
<td></td>
<td>\textit{i-ut-tnt}</td>
<td>'He hit them'</td>
</tr>
</tbody>
</table>

(17) The alternation exhibited by nominative pronoun forms γ/x/κ in the first person singular and the objective pronoun forms in the first person plural ay/ax/ακ is a case of free variation.
affix faithfulness constraints which rather dominate markedness, on a par
with root faithfulness, which accounts for the fact that marked place can
surface in this type of affix. This can explain the markedness of the verbal
affixes as far as consonant place specification is concerned.

We now consider two phonological processes in Tashlhit that provide
independent support for the ranking of root faithfulness and affix faithfulness.

4. ROOT PLACE FAITHFULNESS AND PHONOLOGICAL
ALTERNATIONS

Situations arise in which the input place specification of an affix is not
in correspondence with the output one, in violation of faithfulness. This is
due to the presence in the grammar of Tashlhit of high ranking markedness
constraints against multiple or opposite specifications of the same place
feature within a single morphological form. The Tashlhit affixes listed above
do in fact participate in certain interesting phonological alternations, and
given the ranking RF>>AF established above, the prediction is that the root
consonants will be the triggering factors of phonological operations, while
the affix elements will be the targets, a fact indicative of positional
faithfulness (Beckman, 1997, 1998; Selkirk, 1994, 1995; McCarthy and
Prince, 1994, 1995). Such a prediction is largely borne out by assimilatory
and dissimilatory phenomena in the language.

4.1. Assimilation

Tashlhit exhibits an assimilation process affecting the feature
specification of the causative morpheme. Specified underlingly as a
voiceless, anterior, alveolar sibilant (subject to a quantity alternation (31i)),
this morpheme surfaces in certain contexts as a voiced^{18} alveolar fricative
(31ii) and in others as a voiceless palatal fricative (31iii), and in yet others as
a voiced palatal fricative (31iv). Many scholars have pointed out this
alternation, and attempts at elucidating the triggering factors have been made
(Lasri, 1991; Elmedlaoui, 1992). The relevant facts are given in (31):

(18) Voicing assimilation in causatives will not be dealt with in the present paper. If considered
alone, the accompanying agreement in voicing provides evidence for our hypothesis, but
if voicing assimilation facts in the language are considered globally, it turns out that it
rather challenges RF>>AF. Elisabeth Selkirk (p.c.) has pointed out to me that voicing
assimilation is rather parasitic on anterior assimilation. Pointing in the same direction,
Elmedlaoui's (1992) account is based on the idea that the assimilation affecting the
features [anterior] and [voice] should be conceived of as two independent operations for
the simple reason that [anterior] and [voice] are dominated by different nodes in the
feature geometry, so much so that simultaneous spreading of the two features is
practically impossible.
Previous treatments of the anterior alternation affecting Tashlhit causatives (Elmedlaoui, 1992 and Lasri, 1991) are operational and directional. The basis of the analysis is the existence in the grammar of the language of a co-occurrence constraint on the anteriority of sibilants and the operation of a right to left spreading repair process of the feature [-anterior] in case the word contains opposite anterior specifications.

In Elmedlaoui’s (1992) analysis, the hypothesis is advanced and justified that the directionality of application of the process is from right-to-left\(^{19}\). The account conceives of anteriority assimilation as a percolation operation affecting the feature [anterior] and assigning it to the [strident] node, which becomes then dependent on the coronal articulator. The dependency assumed guarantees that no non-sibilant coronal can block the spreading of [-anterior], the formalization of which is as follows:

\(32\) Anteriority assimilation: /ss-ašk/ \(\rightarrow\) [šš- ašk]

---

\(^{19}\) Elmedlaoui (1992) states that there is no evidence for the fact that spreading is bidirectional since there are no suffixes in the language that will show what will happen if the target were on the right (a left-to-right application).
Lasri's (1991) account of the same phenomenon differs from Elmedlaoui's as a matter of formal detail. The basic generalizations are still expressed, though within a different conceptual apparatus. Lasri (1991:205) observes that morphemes containing two sibilants with different values for [anterior] are nonexistent. For that matter he formulates the following conditions:

\[(33) \text{Condition on co-occurrence of sibilants in Tashlhit (Lasri, 1991: 205-6)\textsuperscript{20}}:\]

\[(i) \ *[\mu[ x \ x]] \ (\text{non-identical sibilants are excluded})\]
\[\text{[ant] [-ant]}\]

\[(ii) \ [\mu[...C_1...C_i...]] \ (\text{identical, though distant, sibilants are allowed})\]
\[C_i = \alpha \text{ anterior}\]

The treatment he offers is as follows:

\[(34) \text{Sibilant Harmony in Tashlhit (Lasri, 1991:208)}:\]

Domain: Word
Tier: Anterior
Change: Spread [-anterior] towards coronal.

Lasri's account can be very succinctly summarized as follows. There is action-at-a-distance involved. Coronal stops are transparent to the process, and coronal sonorants neither trigger nor block the anteriority assimilation operation which is exceptionless, affecting even loan words.

We will not attempt a reanalysis of the whole process here, something beyond the scope of the present paper. We will basically claim that the alternation affecting the causative morpheme in terms of anteriority is due to a large extent to the ranking RF>>AF, supplanting the operational directionality approach to the issue. One of the pertinent remarks made by Elmedlaoui (1992:23), though, is that in the anteriority assimilation process, the root segment is the trigger and the affix segment the target: “c'est la spécification de la sibilante du radical qui détermine celle de la sibilante du préfixe.” While this remains a correct generalization, the one constituting the basis of the analysis in this paper, the formalization of the idea cannot be achieved in Elmedlaoui (1992), absent a theory of root faithfulness.

(20) Lasri also deals with the voicing assimilation affecting the causative morpheme in Tashlhit. We have omitted from Lasri's constraint the voicing specifications of the segments as these are not relevant to the present discussion.
In analyzing anteriority assimilation in Tashlhit within the positional faithfulness framework, there is a very important remark to start with. The feature [-anterior] is asymmetrically distributed in Tashlhit roots and affixes. The fact that this feature does not participate in the specification of any affixes in the language is a strong argument for the fact that the markedness constraint *[[-ant] (the equivalent of "[-anterior] features are banned") should dominate IDENT(F):

(35) *[[-ant]]>>IDENT(F): No [-ant] affixes in Tashlhit:

<table>
<thead>
<tr>
<th>Input: Aff/Caus. ss</th>
<th>* [-ant]</th>
<th>IDENT(F)</th>
<th>* [+ ant]</th>
</tr>
</thead>
<tbody>
<tr>
<td>$s$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\xi \xi$</td>
<td>*!</td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

A quick comparison with roots, however, reveals the now familiar asymmetry: the [-ant] feature is freely distributed in the root domain, which argues for the ranking of IDENT-Root(F) above the markedness constraint *[[-ant]], ensuring that roots can be specified for [-ant] without nonetheless being ill-formed, a positional faithfulness effect:

(36) IDENT-Root(F) >> *[[-ant]: [-ant] root consonants attested in Tashlhit:

<table>
<thead>
<tr>
<th>Input: Root $\xi$</th>
<th>IDENT-R (F)</th>
<th>*[-ant]</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\xi$</td>
<td>*!</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Input: Aff/Caus. ss</th>
<th>* [-ant]</th>
<th>IDENT(R)</th>
<th>* [+ ant]</th>
</tr>
</thead>
<tbody>
<tr>
<td>$s$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\xi \xi$</td>
<td>*!</td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

On the basis of tableaux (35) and (36), the asymmetrical behavior of the feature [-ant] is reminiscent of the general pattern of featural markedness in the language, which we have accounted for by the meta-constraint RF>>AF. Given the transitivity of constraint ranking in OT, the following sub-hierarchy is established for the relevant markedness and faithfulness constraints: IDENT-Root(F)>>*[[-ant]]>>IDENT(F).

As has been proven in anterior literature, the rather exceptionless assimilation affecting the place specification of the causative morpheme in Tashlhit alters the [+anterior] specification of the affix so that it shares the same specification [-anterior] with the root consonant. Given the morpheme structure conditions (33) in the language, we will claim that there is a markedness constraint that is obeyed so that the condition on the distribution of anteriority in Tashlhit words is satisfied. This constraint we formulate as AGREE-ANTERIOR, after Lombardi’s (1995) AGREE constraint (originally used to account for voicing assimilation):
(37) AGREE-ANTERIOR (AGREE-ANT): anterior specifications in a word must be identical.

The assimilatory behavior of the causative morpheme is due to the relative low ranking of the general faithfulness constraint IDENT(F), regulating the distribution of anteriority in affixes, with regards to both the more specific root faithfulness constraint IDENT-Root(F) and the markedness constraint AGREE-ANT. The relevant rankings do not differ much from the ranking established for the distribution of lexical contrasts in roots and affixes, with the exception that there is no provable ranking between the faithfulness constraint IDENT-Root(F) and the markedness constraint AGREE-ANT.

The dominance of IDENT-Root(F) over IDENT-(F) has been demonstrated in (35) and (36) above. Now we show that the markedness constraint AGREE-ANT and the general faithfulness constraint IDENT(F) have conflicting demands of well-formedness, an argument for the fact that markedness outranks general faithfulness:

(38) AGREE-ANT >> IDENT(F): assimilation forces violation of affix faithfulness:

<table>
<thead>
<tr>
<th>Input: ss-aš k</th>
<th>AGREE-ANT</th>
<th>IDENT (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>šš aš k</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>ssaš k</td>
<td>*!</td>
<td></td>
</tr>
</tbody>
</table>

The result obtained is: in any case displaying opposite antenonty specifications, there will be agreement between the specification of the root and that of the affix, the specification of the root being the winner. Assimilation is thus satisfied and root-faithfulness preserved, although at the cost of general faithfulness violation.

While it is clear that the markedness constraint *[-ant] intervenes between the specific faithfulness constraint IDENT-Root(F) and the general faithfulness constraint IDENT(F), no provable direct ranking holds between the faithfulness constraint IDENT-Root(F) and the markedness constraint AGREE-ANT. The markedness constraint AGREE emerges thus as an undominated constraint, which entitles it to a top-rank in the hierarchy. Taking this into consideration, the following hierarchy is established, which, we claim, is responsible for anteriority assimilation in Tashlhit:

(39) Anteriority assimilation in Tashlhit:

AGREE-ANT, IDENT-Root(F) >> *[-ant] >> IDENT(F)
The emerging picture is that anteriority assimilation leads to an unfaithful pairing between the input anteriority specification of the affix and its output in order to make it look like that of the root segment, so that the latter remains faithful to its input.

An illustrative example of the working of the hierarchy established for assimilation in terms of anteriority is provided in (40), where candidates associated with the input /ss-nžm/ (make safe) are assessed:

(40) Sibilant anteriority assimilation in Tashlhit:\n
<table>
<thead>
<tr>
<th>INPUT: = ss-nžm</th>
<th>AGREE-ANT</th>
<th>ID-R(F)</th>
<th>*[-ant]</th>
<th>IDENT(F)</th>
<th>* [+ ant]</th>
</tr>
</thead>
<tbody>
<tr>
<td>a- ss-nžm</td>
<td>*!</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>b- ss-nzm</td>
<td></td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>**</td>
</tr>
<tr>
<td>c- žž-nžm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

The faithful candidate (40a) fails because it does not satisfy the constraint AGREE-ANT. Although it satisfies AGREE-ANT, candidate (40b) fails because it incurs a fatal IDENT-Root(F) violation as the input anterior feature of the root sibilant is not faithfully reproduced. The optimal candidate is (40c), the one satisfying AGREE-ANT and not violating IDENT-Root(F), although sacrificing IDENT(F).

The same ranking responsible for the assimilating cases accounts for the non-assimilating ones without further stipulation. Tableau (41) shows that when the root does not contain any anterior sibilant consonant, the affix keeps its anteriority specification:

(41) AGREE-ANT satisfied: No anteriority assimilation:

<table>
<thead>
<tr>
<th>INPUT = ss-lkm</th>
<th>AGREE-ANT</th>
<th>ID-R (F)</th>
<th>*[-ant]</th>
<th>IDENT (F)</th>
<th>* [+ ant]</th>
</tr>
</thead>
<tbody>
<tr>
<td>a- ss-lkm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b- žž-lkm</td>
<td></td>
<td>*!</td>
<td>*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In (40), the assimilating candidates are assigned two violation marks. Conceiving of assimilation in an autosegmental manner as spreading of featural nodes as in (32), we would rather assign only one violation mark for the linked featural structure. This does not affect the point being made, nor the optimality of candidate (40c). It can be argued that the anteriority assimilation ultimately reduces markedness. If markedness is computed on the basis of the violations incurred, and if an assimilated structure shares a linked feature configuration and by virtue of that incurs only one violation mark, then an assimilated candidate is featurally less marked than a non-assimilated one:

<table>
<thead>
<tr>
<th>Input : ss-nžm</th>
<th>[-ant]</th>
<th>[+ant]</th>
</tr>
</thead>
<tbody>
<tr>
<td>ss-nžm</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>žž-nžm</td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>
The optimality of (41a) and the ill-formedness of (41b) prove that faithfulness to input anterior specifications fails only when featural markedness is at stake.

To sum up, the analysis proposed here of anteriority assimilations affecting the causative morpheme in Tashlhit is based on the same ranking governing the asymmetry of featural distribution in roots and affixes in the same language. A markedness constraint, in the case at hand the constraint AGREE-ANTERIOR banning within the same word any instance of two sibilants not sharing the same specifications for anteriority, interacts with the specific faithfulness constraint IDENT-Root(F) and the general faithfulness constraint IDENT(F), a positional faithfulness effect.

Additional arguments for the hypothesis underlying the present study can be sought elsewhere in the phonology of Tashlhit, namely in facts relating to consonant dissimilation, which are analyzed in the following section.

4.2 Dissimilation

Tashlhit displays a set of labial dissimilation phenomena that have received extensive treatment in the past (see Boukous, 1987; Lasri, 1991; Elmediaoui, 1985, 1992; Selkirk, 1993, 1995; Jebbour, 1985; Bensoukas, 1999; Alderete, 1997). In this section, we will focus on the dissimilation process affecting the primary labiality\(^{22}\) of the agentive and reciprocal affixes, the relevant facts of which are given in the sets (42) and (43) below:

\[(42)\text{Agentive noun morpheme delabialization:}\]

\[(i)\text{ Non-delabialized agentive nouns:}\]

- krz a-m-kraz plow
- hDr a-m-hDDr play
- ags a-m-agus injure
- kkusu i-m-kkisi inherit

\[(22)\text{Velar labial dissimilation is the other facet of delabialization in Tashlhit. Targetting the root secondary labial specification, this process seems at first sight to provide counter-evidence for RF>>AF. We do not deal with this aspect here for two reasons. First, an analysis of velar labial dissimilation needs treatment of other intricate issues in the phonology of the language that are beyond the scope of the present study. Furthermore, the labiality involved in the velar labial consonants is within the purview of vowel place, rather than consonant place. For a treatment of issues related to root faithfulness and the full array of labial alternations in Tashlhit, see Bensoukas (1999).}\]
(ii) Delabialized agentive nouns (trigger underlined and target in bold):

<table>
<thead>
<tr>
<th></th>
<th>a-n-</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>mgr</td>
<td>a-n-mgar</td>
<td>harvest</td>
</tr>
<tr>
<td>frn</td>
<td>a-n-fran</td>
<td>sort out</td>
</tr>
<tr>
<td>g*mr</td>
<td>a-n-g*mar</td>
<td>hunt</td>
</tr>
<tr>
<td>Dfr</td>
<td>a-n-Dfur</td>
<td>follow</td>
</tr>
<tr>
<td>ag*m</td>
<td>a-n-agam</td>
<td>draw water</td>
</tr>
</tbody>
</table>

(43) Reciprocal morpheme delabialization:

(i) Non-delabialized reciprocal forms :

<table>
<thead>
<tr>
<th></th>
<th>m-</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>κawm</td>
<td>m-κawan</td>
<td>help</td>
</tr>
<tr>
<td>rg</td>
<td>mm-rg</td>
<td>break</td>
</tr>
<tr>
<td>κada</td>
<td>m-κada</td>
<td>be near</td>
</tr>
</tbody>
</table>

(ii) Delabialized reciprocal forms (trigger underlined and target in bold):

<table>
<thead>
<tr>
<th></th>
<th>n-</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>sllm</td>
<td>n-sallam</td>
<td>greet</td>
</tr>
<tr>
<td>fts</td>
<td>n-fattas</td>
<td>chop</td>
</tr>
<tr>
<td>κubbu</td>
<td>n-κubbu</td>
<td>love</td>
</tr>
<tr>
<td>xlf</td>
<td>n-xalaf</td>
<td>change</td>
</tr>
</tbody>
</table>

The alternation is quite systematic, showing that a kind of action-at-a-distance effect is at play: the agentive noun and reciprocal morphemes, both m feature-wise, change to n whenever the verbal base they are attached to contains a primary labial consonant (underlined in (42) and (43)), irrespective of the (non-)adjacency of the trigger and the target.

Despite the differences in the theoretical approaches adopted as well as in the details of analysis, Boukous (1987), Elmedlaoui (1992), Lasri (1991) and Selkirk (1993) consent on the basic idea that the m/n alternation exhibited by Tashlhit agentive nouns and reciprocal forms results from a dissimilatory process affecting the agentive noun and reciprocal morphemes whenever they are affixed to contains any one of the primary labial consonants of the language b, f and m, an OCP effect (McCarthy, 1986; Yip, 1988) banning the co-occurrence of two labial specifications within the same word.

The main points of the previous approaches can be summarized as follows:
(i) The domain of primary labial dissimilation is restricted to the word.

(ii) The dissimilatory operation is a repair strategy mending the morphologically created offending labial labial co-occurrence.

(iii) The dissimilated labial nasal always surfaces as a coronal nasal.

(iv) The dissimilatory operation proceeds from right-to-left.

Labial dissimilation in Tashlhit is construed as a feature-changing operation that has received various formulations, linear (Boukous, 1987) and non-linear (Lasri, 1991 and Elmedlaoui, 1992):

(44) Tashlhit primary labial dissimilation: different formulations:

(i) Boukous's (1987:457) delabialization rule:

\[
\begin{array}{c}
\text{+ nas} \\
\text{- cor}
\end{array} \rightarrow [+ \text{cor}] / (w (...) \rightarrow (...) [+ \text{lab}] (...) w)
\]

(ii) Elmedlaoui's (1992:78) labial dissimilation rule:

\[
[\text{Labial}]
\]

(iii) Lasri's (1991:80) consonant labial dissimilation:

*Domain:* Word  
*Tier:* Labial (C-Place)  
*Change:* a- Deletion of the first matrix  
 b- Default fill-in of the place feature.

Boukous formulates the rule as a linear feature-changing rule affecting the labial consonant and changing it into the coronal nasal. Elmedlaoui and Lasri both conceive of the dissimilation process as operating in two steps: the delinking of the offending labial feature and the coronal default fill-in, with the target of the dissimilatory process being the segment on the left.

The trigger of the dissimilation process for Lasri and Elmedlaoui is some sort of constraint on labials in Tashlhit, which is formulated as a morpheme structure condition, and which is a version of the general OCP constraint:
i- Lasri (1991:78)'s morpheme structure condition:
   *[µ..[Labial]..[Labial]..]

ii- Elmedlaoui (1992:77)'s formulation of the constraint on labials in Tashlhit:

   Domain of */#: first affixational cycle
   [labial]

Thus, a combination of two primary labials in Tashlhit that results from some morphological operation is an offending structure that needs repairing, and that constitutes the raison d'être of the dissimilation rules formulated. As to the directionality of application of the process, it is assumed to ensue from general considerations of assimilatory and dissimilatory phenomena in the language. Elmedlaoui and Lasri have provided ample evidence for the fact that most assimilatory phenomena in the language are triggered by segments that have their targets to the left. The dissimilation processes have been proven to be no exception to the general directionality of application of phonological processes in the language.

With this background in mind, let's provide an analysis of the primary delabialization process in Tashlhit. Unlike the feature [anterior] whose distribution is asymmetrical in roots and affixes, the feature [labial] is equally attested in roots and affixes, which argues for the ranking of both faithfulness constraints IDENT-Root(F) and IDENT(F) above the markedness constraint *LAB as in (46) and (47):

(46) IDENT-Root(F) >> *LAB: primary labial root consonants attested in Tashlhit:

<table>
<thead>
<tr>
<th>Input: Root m</th>
<th>IDENT-R (F)</th>
<th>* LAB</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>!</td>
<td></td>
</tr>
<tr>
<td>m</td>
<td>!</td>
<td>*</td>
</tr>
</tbody>
</table>

(47) IDENT(F) >>*LAB: Primary consonantal labiality attested in Tashlhit affixes:

<table>
<thead>
<tr>
<th>Input: Aff/Recip. m</th>
<th>IDENT (F)</th>
<th>* LAB</th>
</tr>
</thead>
<tbody>
<tr>
<td>m</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>n</td>
<td>!</td>
<td></td>
</tr>
</tbody>
</table>
The rankings established in (46) and (47) predict that, by virtue of its being outranked by both faithfulness constraints, the markedness constraint \(*\text{LAB}\) will not prevent any primary labial features specified underlyingly in roots or affixes alike from surfacing, unless faithfulness is sacrificed to satisfy some dominating markedness (or other) constraint.

A case in point is that even though labial specifications are not totally ruled out in affixes, the facts listed above in (42) and (43) testify to the existence in the language of violations of the general faithfulness constraint IDENT(F) when the root contains a primary labial consonant. Previous accounts of this behavior postulated a co-occurrence constraint on the distribution of the feature \([\text{labial}]\), so that no stem may contain a double specification for this feature. This constraint is complemented with the directionality of rule application to ensure that the labial specification that is targeted by the process is the one on the left, which coincides, in our terms, with the affixal one.

OT treatments of the phenomenon of Tashlhit labial dissimilation, on the other hand, rely on the interaction of constraints on well-formedness and do not have recourse to rule applications. We assume the correctness of the two OT treatments of the process of Tashlhit primary labial dissimilation in the literature, namely the OCP>>Faith analysis (Selkirk, 1995) and the local conjunction analysis (Alderete, 1997), the findings of which we will use as additional support for the analysis defended so far in the present paper.

Focusing on Berber and Standard Arabic, Selkirk (1995) contains an analysis of the interaction of the constraints on featural faithfulness and the OCP in the family of Afro-Asiatic languages. The OCP>>Faith analysis relies on faithfulness constraints as formulated within the PARSE/FILL theory of Prince and Smolensky (1993), the precursor of the Correspondence framework adopted in this paper. The constraints are, however, easily translated into correspondence theory terms. “Parse F in root” and “Parse F” of Selkirk (1995) are respectively similar to our IDENT-Root(F) and IDENT(F), and the rather general “OCP” constraint, banning the co-occurrence of like features is made more specific by the \(*\text{PL/LAB}^\text{stem}\) constraint in (48) below (Alderete, 1997). For the sake of conformity, in the remainder of the discussion, we will be using our constraints instead of the OCP>>Faith analysis ones except when necessary.

Much in the spirit of local self-conjunction of constraints proposed in Alderete (1997), which argues that the phenomenon of Tashlhit
delabialization\(^{(23)}\) provides evidence for the notion of constraint conjunction (Smolensky, 1993, 1995 and others), we reinterpret the non-co-occurrence of primary labial consonants in a word as the effect of a markedness constraint on multiple labial specifications in the local context of the stem:

\[(48)\] **Constraint on the markedness of multiple labial specifications in Tashlhit stems (Alderete, 1997:11)**:

\[\star PL/LAB^2_{Stem}~\text{Ban any stem with two segments with independent Place specifications (labial).}\]

Conceived of here as resulting from the interaction of markedness and faithfulness, which will be shown to supplant the directionality of rule application, Tashlhit primary delabialization is here offered an account within the purview of the general hypothesis of the present study.

The first task now is to show what possible interactions there are among the faithfulness constraints (IDENT-Root(F) and IDENT(F)) and the markedness constraint \(\star PL/LAB^2_{Stem}\) (the other markedness constraint \(\star LAB\) plays no crucial role in the analysis and will therefore be ignored in the discussion but will figure in the following tableaux for the sake of completeness). The ranking argument, presented in Selkirk (1995), concerns the higher rank of markedness over general faithfulness - the only ranking which can force faithfulness violation to spare markedness violation:

\[(49)\] \(\star PL/LAB^3_{Stem} \gg IDENT:\text{markedness compels loss of affix labiality:}\]

<table>
<thead>
<tr>
<th>Input: a-m-lmd</th>
<th>(\star PL/LAB^3_{Stem})</th>
<th>IDENT (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a- a-n-lmad</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b- a-m-lmad</td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

It emerges from consideration of the candidates in (49) that markedness satisfaction is more important than general affix faithfulness. The faithful candidate (49b) in fact incurs a violation of markedness and is accordingly ruled out.

Second, if faithfulness is compelled to yield to satisfy some other constraint, root faithfulness wins over affix faithfulness, revealing again the dominance relation holding between IDENT-Root(F) and IDENT(F):

\((23)\) Alderete (1997) also points out the interesting fact that \(\star PL/COR^2_{Stem}\), banning the co-occurrence of two coronal consonants in a stem, appears not to be operative in Tashlhit. This turns out to be the expected situation given the hierarchy of place markedness constraints.

\((24)\) Selkirk (1995) proposes a family of OCP constraints on the basis of the behavior of the labial place specifications in Tashlhit. Although strictly observed, the requirement that no two labials co-occur is subject to a domain condition. While highly operative at the level of the root and stem, labial dissimilation does not apply in larger domains.
(50) IDENT-Root(F) >> IDENT(F): loss of the affixal labial place is less serious than that of the radical one:

<table>
<thead>
<tr>
<th>Input: a-m-lnad</th>
<th>IDENT-R (F)</th>
<th>IDENT (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a- a-n-lnad</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>b- a-m-lnad</td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

Examination of the candidates in (50) shows that satisfaction of IDENT-Root(F) is more important than satisfaction of IDENT(F). Candidate (50a) thus emerges as the optimal output form since it incurs a less serious violation of faithfulness than candidate (50b).

The last decision to be made concerns the interaction of *PL/LAB2Stem and IDENT-Root. The proposal in the OCP>>Faith analysis is that faithfulness is outranked by markedness, a dominance that accounts for co-occurrence restrictions within morphemes. Supposing a root contains two labials, the prediction made by the OCP>>Faith analysis is that only one will surface. The constraint hierarchy accounting for Tashlhit labial dissimilation (Selkirk, 1995:7) is given in (51), in which we enclose between brackets beneath each OCP>>Faith constraint our corresponding constraint:

(51) Tashlhit labial dissimilation: OCP >> Parse F in root >> Parse F:

<table>
<thead>
<tr>
<th>Input: C...[C..C... Lab Lab</th>
<th>OPC</th>
<th>Parse F in root &amp; IDENT-R (F)</th>
<th>Parse F</th>
</tr>
</thead>
<tbody>
<tr>
<td>a- C...[C... Lab Lab</td>
<td>*!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b- C...[C... &lt;Lab&gt; Lab</td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>c- C...[C... Lab &lt;Lab&gt;</td>
<td>*!</td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

In tableau (51), the labial feature enclosed between "<>" is the one affected by the process of labial dissimilation and the symbol "[" indicates prefix boundary. For more clarity, tableau (51) is rendered with examples in (52):
(52)

As in (51), focus is on three candidates only. The first one (52a), although totally faithful, satisfying both general and specific faithfulness constraints, incurs a fatal violation of markedness. The second and third candidates both resolve the labiality clash, each one in its own way. Candidate (52c) delabializes the root labial consonant. It therefore fails at IDENT-Root(F), which is fatal. Candidate, (52b) is the only one drawing a compromise between faithfulness and markedness, by satisfying higher rank *PL/LAB2Stem and violating only low ranked IDENT(F).

To wind up the discussion, the dissimilation process affecting the agentive noun morpheme and the reciprocal morpheme can be accounted for along the same lines as suggested above for (i) the asymmetry in radical versus affixal specifications and (ii) the process of anteriority assimilation, by ranking the root faithfulness constraint IDENT-Root(F) relatively higher in the hierarchy than the general faithfulness constraint IDENT(F):

(53) **Primary labial dissimilation in Tashlhit: result of positional faithfulness:**

*PL/LAB2Stem >> IDENT-Root(F) >> IDENT(F) >> *LAB

The resulting effect is one banning two identical labial specifications within the same stem, by not parsing the labiality of the affix when need be, with the emerging picture being as highly predicted one of positional faithfulness.

The following tableau shows the pertinence of this ranking (the example we give here is an agentive noun, but the analysis qualifies over the reciprocal morpheme as well):

(54) **Tashlhit primary labial dissimilation:**

This ranking ensures that it is the affix labial consonant that loses its labiality in the competition whereas the root labial remains intact, a result of the meta-
constraint $RF \gg AF$. All that is needed here are the two faithfulness constraints, IDENT-Root(F) and IDENT(F), and the markedness constraint $^{*}\text{PL/LAB}^2_{\text{Stem}}$ on the distribution of the primary labial place within stems. The faithfull candidate (54a) $a$-$m$-$mgar$, the challenger of the optimal candidate (54c) $a$-$n$-$mgar$, incurs a violation mark for the constraint $^{*}\text{PL/LAB}^2_{\text{Stem}}$, which $a$-$n$-$mgar$ spares. Of course, the remaining candidate, (54b), in which it is the root rather than the affix labiality that is delabialized, is judged suboptimal as it violates high rank IDENT-Root(F).

The same ranking predicts that if there are no inimical labial specifications in a word, the labial consonant $m$ of the morpheme will surface unscathed:

(55) $^{*}\text{PL/LAB}^2_{\text{Stem}}$ satisfied: No labial dissimilation:

<table>
<thead>
<tr>
<th>INPUT=$a$-$m$-$krz$</th>
<th>$^{*}\text{PL/LAB}^2_{\text{Stem}}$</th>
<th>IDENT-R (F)</th>
<th>IDENT (F)</th>
<th>$^{*}\text{LAB}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$a$-$n$-$krz$</td>
<td></td>
<td></td>
<td>$!$</td>
<td></td>
</tr>
<tr>
<td>$b$-$a$-$n$-$kraz$</td>
<td></td>
<td></td>
<td>$!$</td>
<td>$*$</td>
</tr>
</tbody>
</table>

The prediction turns out to be quite borne out. The violation of IDENT(F) is gratuitous in (55a), which makes the candidate lose in favor of the faithful one, the optimal candidate (55b). This is clear proof that violation of faithfulness in the case of primary delabialization is forced only by the dominating markedness constraint $^{*}\text{PL/LAB}^2_{\text{Stem}}$.

To conclude, the analysis of primary labial dissimilation in Tashlhit, based on the meta constraint $RF \gg AF$, reminds us of the analysis provided above for the anteriority assimilation process of the language. The affinities between the two processes, assimilatory and dissimilatory, is captured without having recourse to serial derivation, or to directionality effects. It ensues systematically from positional faithfulness facts widely justified in this paper, and which have accounted for the relative unmarkedness of affixal feature specifications with regards to radical ones.

5. CONCLUSION

In this paper, we have argued for the theory of positional faithfulness in Tashlhit. The starting point was the relative featural unmarkedness of affixal elements with respect to radical ones. We have provided ample evidence for the meta-constraint $RF \gg AF$, ranging from the asymmetry exhibited by lexical contrasts in roots, on the one hand, and affixes, on the other hand, to assimilatory and dissimilatory processes manipulating affixes.

Conducted without having recourse to operational directional processes, the analysis has proven that $RF \gg AF$ uniformly accounts for both
the absence of marked features in affixes and for the roots functioning as triggers of phonological processes. Phonological activity is here demonstrated to ensue from the interaction of very general considerations of output well-formedness. We have shown that independently motivated well-formedness constraints that are of a very general formulation make possible a neat account of two independent facts, both revealing markedness neutralization: (i) the asymmetrical behavior of different features in the characterization of lexical contrasts in roots and affixes and (ii) the loss of affix underlying feature specifications when necessary. There is no need for either operational or directional processes applying to mend some ill-formed structure and no need for phonological rules in the first place.

We have argued that the two phonological processes considered in this paper, Tashlhit anteriority assimilation and primary labial dissimilation, do reduce the markedness of the phonological representations in which they participate since the resulting representations in either case are less marked than the totally faithful ones. This brings into alignment both these processes and the lexical contrasts in affixes and roots, affixes tending to be less marked. In case there are conflicting specifications, unmarkedness is achieved at the cost of losing input affix feature specifications, which largely argues for the framework of positional faithfulness espoused in the present study.

To conclude, at least two issues have to be considered in the light of the analysis proposed in this paper. First, how is one to distinguish affixes from “clitics”, the latter being outstandingly marked within the perspective of the present paper? An analysis of these has to show why their featural specifications may be very marked, and yet optimal. The second issue concerns treatment of other Tashlhit phonological processes (word final voicing assimilation, secondary labial dissimilation, degemination, etc.) that seem to provide counter-evidence to RF>>AF, or at least show that root faithfulness may be minimally violated, which means in OT thinking that it should be dominated by some other constraints. We leave consideration of these two issues, as well as any other related ones, for future research.
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