INFIXATION IN CHINESE DIALECTS: AN OPTIMALITY ANALYSIS

Jun Da

The University of Texas at Austin

0. Introduction

In various Chinese dialects a bisyllabic word is often made up of a monosyllabic stem and an affix. While both syllabic prefix and suffix are the two major forms of affixation, segmental infix is also a productive element for word formation. This paper proposes an Optimality-theoretic analysis of the infix /l/ and its implementation in two Chinese dialects. The major goal of this paper is to re-analyze the *fanqie* word formation in Chinese as an infixation process. An attempt is also made to subsume the so-called L(ateral)-infixation and R(etroflex)-suffixation under one morphological operation in Chinese. It should be pointed out that this study is of a preliminary nature. It is intended as exploratory rather than comprehensive. Only segmental variations associated with the L-infixation will be addressed here.

The paper is organized as follows: In Section 1, I will describe the infix /l/ and the related infixation phenomenon in some Chinese dialects as represented by Yikol and Fuzhou; In Section 2, I will present a brief review of past studies on the infixation process analyzed as a case of *fanqie* word formation; In Section 3, I will introduce the syntax and semantics of Optimality Theory which is to serve as the theoretical background of this study; In Section 4, I will apply the Optimality insights into the infixation phenomenon in the two dialects. In Section 5, I will conclude this paper by addressing some relevant issues in Chinese morphology.

1. Infixation in two Chinese dialects: basic facts

In some Chinese dialects, there is a word formation process which converts a monosyllabic stem into a bisyllabic word with the help of the lateral /l/ as an infix. Such a derived word has been known under various names such as *fanqie* word, bisyllabified word or simply L(ateral)-infixed word. In Fuzhou Chinese, for example, an L-infixed word can be described as follows: When the input monosyllable contains a single vowel, the first syllable of the derived bisyllabic word will be the same as the input, whereas the second syllable will share the same vowel as the input and contain a default lateral [l] at its initial position. (1) provides some representative examples of this infixation process: (Data are from Liang 1982, Zheng 1983 and my own informant. Please note that in the following set of examples as well as others in the rest of the paper, the first column stands for the morpheme before infixation, whereas the second after infixation. The third column provides the gloss.)

(1) Fuzhou infixation (I)

pɛ	pɛlɛ	swing
tse	tsele	fringe
ku	kulu	bend down
k'y	k'yly	crook

When, however, the input stem contains a diphthong or a syllable final consonant, the first syllable of the resultant word will partially resemble the input in that the former leaves out the final segment of the latter. Meanwhile, the second syllable is derived in the same manner in that it contains both the default lateral infix and the nucleus of the input syllable. (2) are examples of this aspect of L-infixation in Fuzhou:

(2) Fuzhou infixation (II)

paŋ	palaŋ	unsteady
tiɛu	tiɛliɛu	hang
liŋ	liliŋ	cute
lu	lulu?	wheel
kuŋ	kuluŋ	roll
ny?	nyly?	meat

In both cases, it should be mentioned that the first syllable of an L-infixed word will always carry a falling tone. Its numerical value is 31, using Chao's (1930) tonal labeling system. Semantically, both the observed bisyllabification and the insertion of a default lateral infix do not change the basic meaning of an input stem. It simply assigns an emphatic reading to it.

L-infixation, however, is not limited to Fuzhou alone. It is also found in other Chinese dialects such as Taiyuan (Zhao 1979), Yikol (Li 1991) and Jianou (Pan 1994), though they may differ from each other in some phonetic details. For example, Yikol adopts a similar infixation strategy as Fuzhou in that the monosyllabic input is converted into a bisyllable and that the infix /l/ is placed as the initial position of the second syllable. However, unlike that of Fuzhou, the first syllable of an L-infixed word in Yikol will contain both a syllable-final glottal stop and a neutral vowel [ə] (if the neighboring vowel is low) or a mid front vowel [ɛ] (if the input syllable contains a medial high vowel [i]). The surface tone associated with the initial syllable in the output will carry a low entering tone 21. The following are representatives of L-infixed words in Yikol (Li 1991):

(3) Yikol infixation

pa	pə?la	stir
tau	tə?lau	clichɜ
kan	kə?lan	stick
xuan	xuə?luan	circle, ring
tiau	tiɛ?liau	turn around
tɕin	tɕiɛ?lin	clever
pan	pə?lan	container

As a whole, the infixation phenomenon as seen in the above two dialects constitutes a very interesting case in Chinese morphology. It involves such issues as reduplication, infixation as well as syllable structure in Chinese linguistics. That being the case, it has been a subject of extensive study in the past, though there are still a number of issues unsolved. In the following section, we will briefly summarize past insights into the infixation process and highlight two of the controversial issues.

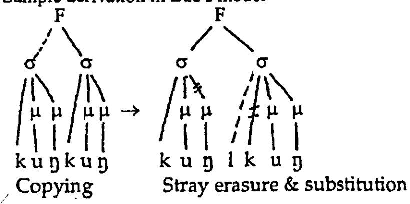
2. Early analyses

In Chinese morphology, the infixation process as seen in the above two dialects has been analyzed as a case of the so-called *fanqie* word formation (cf. Wang 1994). *Fanqie (reverse-cut)* is a traditional method of specifying the pronunciation of a monosyllable from two known monosyllables. It combines the initial (the first consonant) of a first known syllable with the final (the rest of the syllable) of a second known syllable to specify the pronunciation of an unknown syllable (Wang 1972). For example, the pronunciation of the word */su/ (plastic)* can be specified with the first consonant [s] in */san/ (mulberry)* and the rhyme [u] in */gu/ (old)*. This method of specifying pronunciation has been used in a reverse manner for word formation in Chinese dialects, often reported as a form of secret language (Chao 1931, Li 1985, Yip 1982).

Recent autosegmental accounts of the phenomenon are mainly offered by Yip (1982) and Bao (1990). Both studies treat *fanqie* word formation as a reduplication process though they differ in their adopted models of analysis. While Yip follows Marantz's (1982) prespecification model, Bao (1990) bases his analysis on Steriade's (1988) total-copying model of reduplication. For illustration, let us take a brief look at Bao's (1990) analysis.

In Bao (1990), *fanqie* word formation requires two major steps: First copy the base in its entirety to its left and then substitute the relevant structures of each syllable concerned. (4) is a sample derivation for the word /kuŋ/ (*roll*) in Fuzhou:

(4) Sample derivation in Bao's model



In the above example, the input morpheme /kuŋ/ is first copied to the left. Then the onset of the second syllable [k] is replaced by the lateral [l]. The nasal coda [ŋ] in the first syllable is erased in the meantime.

While technically feasible, rule-based accounts such as the above are silent on two important questions: First, they fail to explain why the lateral infix or other similar infixes should be called for to substitute the onset of the second syllable. Secondly, they have provided little motivation to account for the loss of the syllable final segment such as [ŋ] in the first syllable of the derived word /kuluŋ/.

An attempt at making up for the two deficiencies has been made by, for example, Ellison (1993). By proposing two different tiers for consonants and vowels for a Chinese syllable, Ellison argues that the observed dissimilation between the input onset and the inserted infix (such as the lateral in our case) is simply triggered by the OCP (Obligatory Contour Principle, see McCarthy and Prince 1986). However, his model again has ignored the motivation behind the instantiation of the lateral infix in this so-called L-infixation process.

In the following sections, we will provide our account of the lateral-infixation process. What we are going to argue is that L-infixation is in fact closely related to the R(etroflex)-suffix in Chinese morphology. By assuming that both affixes share a common underlying representation, we will be able to show that an Optimality analysis provides a better account of the process. Before we do that, let us take a brief look at the Optimality Theory first.

3. Optimality Theory

Optimality Theory (OT, Prince and Smolensky 1993, McCarthy and Prince 1993a) is a model of constraints and constraints interaction on output representations. In this model, rule-driven derivations have given way to output selection by a set of violable and ranked constraints. In OT, a grammar is made up of two functions: GEN and EVAL. GEN maps an input representation to a set of output candidates. The set of output candidates is then subject to EVAL for evaluation. EVAL contains a constraint hierarchy which evaluates in parallel the well-formedness of each member of the candidate set. The optimal output, i.e., the one with the least violations, is well-formed.

A set of important constraints in OT is the Faithfulness Conditions (Prince and Smolensky 1993) which corresponds to the derivational notion that a rule applies only when its structural descriptions are satisfied:

(5) Faithfulness Conditions
a. PARSE(X):
X must be incorporated into the phonetically-interpreted representation.
b. *STRUCT(X)
*X, where X is a representational element.

PARSE requires that every element in the input must be included in the output and phonetically realized. It would register a violation for each unparsed element in the output representation. *STRUCT, however, opposes any deviations from the input. It will assign a violation for each parsed element in the output.

Let us use a syllabification example to illustrate the basic ideas of OT. Take, for instance, the input string CVCV, GEN will assign various possible syllable structures to the input string. (6) lists a subset of possible candidate outputs:

(6) GEN(CVCV) → {.CV.CV., .CVCV., CVC.V., <CV>. CV., ...}

To select an optimal output from the above set of candidates, we will assume the constraint ONS (Itô 1989) on syllable well-formedness:

(7) ONS
* $_{\sigma}$[V   Avoid onsetless syllable.

This constraint requires that each syllable should contain an initial consonant. It will record a violation for every syllable without an onset. If for Language X, ONS and PARSE are the only two constraints with the ranking ONS >> PARSE, then given three candidates such as {.CV.CV., .<CV>CV., .CVC.V.}, we can predict that .CV.CV. will be the optimal output. The tableau in (8) illustrate this evaluation:

(8) Syllabification of CVCV

	ONS	PARSE
☞ a) .CV.CV.		
b) .<CV>CV.		*!
c) .CVC.V.	*!	

† The pointing hand indicates optimal output.
† Segments contained in triangular brackets are unparsed.
† Period (.) indicates syllable edge.

In this tableau, (8a) turns out to be the optimal output because it does not constitute any violation of the two constraints at all. In comparison, (8b) is not selected because it contains two unparsed segments which violate PARSE. Similarly, (8c) carries an onsetless syllable and violates ONS. It is not selected, either.

By this point, it is now possible for us to introduce two sets of constraints in OT which are relevant for our infixation problem. The first one has to do with affixation and the second reduplication.

In derivational morphology, infixation has its own special treatment. Unlike both straight forward prefixation or suffixation, infixation has to be accounted for with the device of prosodic circumscription (see McCarthy and Prince 1986 for more details). In OT, the three constituent-edge oriented phenomena are subsumed under a single family of well-formedness constraints called Generalized Alignment (McCarthy and Prince 1993c):

(9) Generalized Alignment (McCarthy and Prince 1993c)
Align(Cat 1, Edge1, Cat2, Edge2) $=_{def}$

$\forall$ Cat1 $\exists$ Cat2 such that Edge1 of Cat1 and Edge2 of Cat2 coincide.

Where

Cat1, Cat2 $\in$ PCat $\cup$ GCat

Edge1, Edge2 $\in$ {Right, Left}

In (9) PCat and GCat refer to possible prosodic and grammatical categories, respectively. This constraint requires that a particular edge of Category 1 align along the left- or rightmost edge of Category 2. A case of no violation is, of course, either prefixation or suffixation. It can be seen that any kind of infixation can also be confined by the constraint so long as constraint violation is tolerated. In operational terms, this is simply when other constraints dominate Alignment, a case to be seen in our discussion in Section 4.

We now turn to the relevant account about reduplication in OT. In derivational models, reduplication always requires a copying operation. In OT, however, such a copying operation does not exist. What is there is simply an insertion operation which inserts freely all the possible segments into an input string. So far as the correspondence between the input (=Base) and the inserted structure (=Reduplicant) are concerned, it is shaped by a set of faithfulness constraints stated as follows (McCarthy and Prince 1993b):

(10) Faithfulness Constraints for Reduplication

a. MAX
Every element of B(ase) has a correspondent in R(eduplicant).

b. CONTIGUITY
The portion of the base standing in correspondence forms a contiguous string, as does the correspondent portion of the reduplicant.

c. ANCHORING
Correspondence preserves alignment in the following sense: the left (right) peripheral element of R corresponds to the left (right) peripheral element of B, if R is to the left (right) of B.

In this set of constraints, MAX requires that the input base be identical to the reduplicant. CONTIGUITY demands that the reduplicant does not skip over a contiguous string contained in the input. ANCHORING requires that the edgemost element of the reduplicant should be aligned to either the left or right edge of the base. It can be seen that if a candidate output meets the three requirements, total reduplication will result. However, when there are other constraints dominating any of the three constraints, partial reduplication is to be expected.

4. Infixation in Yikol and Fuzhou: analysis

In Section 2, we have seen that infixation in both Fuzhou and Yikol in general will result in a bisyllabic word. In addition to the default lateral infix on its second syllable, the infixed word has a slightly different manifestation in the two dialects so far as its initial syllable is concerned: In the case of Fuzhou, the initial syllable will contain one less segment than the input monosyllable if the latter has a diphthong or a syllable final consonant. In Yikol, on the other hand, the initial syllable will always contain a neutral vowel or its variant. In this section, we will build up a set of ordered constraints to account for this infixation process. In our analysis, we will use /pɛ/ (*swing*) and /paŋ/ (*unsteady*) from Fuzhou as our working examples.

4.1 The lateral infix

To explain why the lateral [l] is used as a default infix in such word formation process, we need to examine its relationship to the retroflex suffix in Chinese morphology. In various Chinese dialects, the lateral approximant [l] has a very limited distribution, which occurs syllable initially only. In contrast, the retroflex [r] does not occur in every dialect. While it can occur both syllable initially and finally in most Mandarin dialects (such as Beijing), the retroflex has simply disappeared from syllable final position and merged with the lateral at syllable initial position in other southern dialects such as Shanghai. So far as its role in Chinese morphology is concerned, the retroflex [r] can be used as a diminutive morpheme or a dummy element for word formation (see, for example, Yip 1992). In most dialects, it is realized as a suffix, as the following examples from Anxiang (Ying 1990) illustrate:

(11) Retroflex-suffixation in Anxiang

soutçiŋ	soutçiər	towel
p'au	p'aup'ər	hold
tou	toutər	peak
loŋ	loŋlər	cage
kan	kankər	stick
tie	tietiər	plate

However, in other dialects which place a restriction on the distribution of the retroflex, the diminutive morpheme will surface as part of an onset rather than a syllable-final coda and is phonetically realized as a lateral retroflex [ɭ]. Pingding (Xu 1981), as exemplified in (12), is a case in point:

(12) Pingding diminutive

p'ɑ	p'ɭA	knife handle
kua	kɭuA	coat
ts'ɑŋ	ts'ɭɑŋ	waiter
myŋ	mɭyŋ	bright

From the behavior of the diminutive morpheme in the above two dialects as well as the distributional contrasts between the retroflex and lateral in Chinese dialects, we have reason to assume that the observed infix /l/ in both Fuzhou and Yikol originate from the same diminutive morpheme. We will represent the underlying representation of the two affixes with the symbol /R/. Its phonetic implementation is expected to be language-specific.

With the above assumption, we are now able to propose the following Alignment constraint on the possible distribution of R in Chinese dialects:

(13) Align([R]$_{afx}$; Wd, R)
The segmental affix R must be at the right edge of a surface word.

In the above constraint, no edge, i.e., the parameter Edge1 in (9), is specified for the affix since it is segmental. This constraint requires that only those candidates containing a word-final R should be selected. It will register a violation when the affix is either unavailable in the output representation or one displacement away from the right edge of a surface word. The most optimal position for the underlying R, presumably, should be the final position of an output word. For example, given /pɛ/, /pɛR/ is to be expected. While this is exactly the case for many Mandarin dialects in which the affix R is realized as a syllable final retroflex, it is clearly not the case for both Fuzhou and Yikol where the affix somehow has landed on the syllable initial position. Its deviation from the rightmost position in a surface word must, then, be related to other constraints in the two dialects.

One such constraint, we argue, is the Coda Filter (Itô 1989) which prohibits codas from occurring at the syllable final position. We will adopt the principle as the NoCoda constraint after Prince and Smolensky (1993):

(14) NoCoda
$*C]_\sigma$ There must be no coda in a syllable.

This constraint opposes any presence of consonants on the syllable final position. For example, it will register a violation if the affix R occurs at the end of a word. When it dominates Align, we can expect that an optimal output should have R occurring at a position other than the syllable final.

Motivation for this constraint in Chinese follows from the syllable structure simplification process in Chinese history. It has been proposed that Old Chinese used to have a CCVCC syllable template. However, since Middle Chinese, this syllable template has been considerably simplified. In Modern Chinese, the norm has changed into C(G)VC (in which G stands for glides). While codas are still available in Chinese dialects (which may be reminiscent of their Old Chinese origin), we argue that the NoCoda condition is effective in that it must be observed in the productive part of the Chinese morphology. That is, the construction of new words should be shaped by this constraint.

While the above two constraints expects that an optimal output will contain the affix R which appears in other places rather than the final position in a syllable, they do not tell us where it will be located. The fact that the lateral is observed on the second syllable reveals the existence of other constraints in the two dialects. The first one is *COMPLEX:

(15) *COMPLEX (Onset)
*XY Sequences of segments at the onset position are not allowed.

This constraint will simply rule out all the candidates which contains a complex onset. It will register a violation if it finds such a configuration on the onset. One way to avoid violations of this constraint is to have some segment in the onset position unparsed. Obviously, the underlying affix R is not the one to remain unparsed under all circumstances.

Motivation for *COMPLEX, again, follows our argument for NoCoda, namely, since Chinese is still experiencing a simplification process in its syllable structures, no complex segments can be created in its word formation process, whether at syllable final or syllable initial position. Given this nature of the constraint, it is expected that the constraint will not require any crucial ordering with other constraints.

The three constraints proposed so far will help selecting a candidate in which R lands on the onset position in a derived syllable. For example, given the input /pε+R/ we have the evaluation as shown in the following tableau:

(16) /pε+R/ → pεlε swing

	*COMPLEX	NoCoda	ALIGN
☞a) <p>Rε			*
b) pRε	*!		*
c) Rpε	*!		**
d) pεR		*!	

† Note that in this tableau as well as others to come, we will place those constraints such as *COMPLEX which do not require a crucial ordering with other constraints simply in front of other ordered constraints.

In (16), (16a) is the optimal output, even though the affix R is one segment away from the ideal position. In comparison, both (16b) and (16c) fail to be selected because they contain a complex onset, one way or the other hence violating the higher *COMPLEX. Further, (16d) constitutes a violation of NoCoda, even though the underlying affix surfaces at the ideal position.

The evaluation in (16), however, is far from perfect. First, we have not explained why the optimal output in (16a) contains both parsed and unparsed elements. Secondly, the evaluation in (16) fails to consider other possible candidates such as /R<p>ε/ and /p<R>ε/ which are equally good candidate outputs with respect to the three constraints. In reality, we have observed that this onset occurs on the initial syllable of the derived word. To find out the ultimate optimal input, we need a further set of constraints.

4.2 Bisyllabification

Two such constraints are PARSE and *STRUCT which are introduced earlier in Section 3. PARSE requires that every input element must have a phonetic realization, whereas *STRUCT forbids any unnecessary elements to be included in the output:

(17) <u>Faithfulness Conditions</u>
a. PARSE(X):
X must be incorporated into the phonetically-interpreted representation.
b. *STRUCT(X)
*X, where X is a representational element.

When PARSE is applied to (16a), for example, [p] is expected to be parsed. However, it cannot remain in the same syllable as the affix R given the constraint *COMPLEX. To satisfy this constraint, the segment is to appear in a new syllable. However, a single consonant cannot stand alone to form a syllable. A universal constraint on syllable well-formedness requires that a syllable must have a nucleus. This constraint can be represented as FILL (Prince and Smolensky 1993).

(18) FILL
Structural positions must be filled.

Both FILL and PARSE will guarantee an optimal output will contain an additional syllable made up of the parsed input onset (such as [p] in (16a)) and some other elements, though they do not reveal which elements and how many of them are to be used to occupy the vacancy. In terms of ranking, they should be at least higher than *STRUCT. Note that FILL will definitely involve extra elements in the output representation. The necessity of bringing *STRUCT into the scene is based on the observation that in Fuzhou the initial syllable always contains the first underlying segment in the input. In derivational approach, this is simply referred to as partial reduplication. Under current analysis, it can be understood as the requirement of *STRUCT: The constraint requires that the optimal output contains minimal elements so long as other conditions are met. That is why only one nuclear segment is used to construct the new syllable and hence the observed partial reduplication.

The selection of the L-infixed word from a bisyllabic input will involve two more constraints, i.e., CONTIGUITY and MAX, in addition to *STRUCT, since the latter will only be responsible for the insertion of a minimal number of segments. Both CONTIGUITY and MAX will guarantee that only the leftmost segments in the input will be selected to construct the expected initial syllable. So far as their individual rankings in the hierarchy are concerned, *STRUCT is to be ranked below PARSE, CONTIGUITY and FILL. MAX, on the other hand, is to be placed lower than *STRUCT and Alignment since the observed reduplication in the infixed word is only partial. It is apparent that the consideration for minimal effects dominates in Chinese morphology. The following tableau demonstrates the interaction among the set of constraints proposed in this section:

(19) /paŋ+R/ → palaŋ hang

	PARSE	CONTI.	FILL	*STRUCT	MAX
☞a) .pa.Raŋ.				*****	**
b) .<p>Raŋ.	*!			***	
c) .p.Raŋ.			*!	****	***
d) .paŋ.Raŋ.				******!	
e) .pŋ.Raŋ.†		*!		*****	*

† Note that nasal can also be syllabic in Chinese dialects. So there is no need to interpret it as a violation of the constraint FILL.

In (19), it can be seen that (19a) is the optimal output, even though it violates both *STRUCT and MAX. In comparison, all the other candidates constitute worse violations than (19a). For example, (19b) contains an unparsed element and violates PARSE; (19c) contains an unfilled syllable and violates FILL; (19d) simply contains more segments than (19a) which violates more seriously *STRUCT; The initial syllable of (19e) contains only the initial and final segment as compared with the input string and violates CONTIGUITY.

4.3 Phonetic conditioning

In Section 2, we have mentioned that the major difference between Yikol and Fuzhou L-infixed words is that the former's initial syllable always contains a neutral vowel if the onset does not contain a medial high vowel [i]. Otherwise, it will be a mid-front vowel. Further, we have mentioned that the same syllable is associated with a glottal and default entering tone.

The vowel neutralization found in Yikol L-infixation can be tentatively explained in terms of the relation between the glottal stop and the entering tone. There is evidence (Li 1989, Iwata, Hirose, Niimi and Horiguchi 1990) which shows that the glottal stop in Chinese is in fact not a segment but tonemic. It is associated with the entering tone which is short and weak. Based on this finding, we argue that the infixed word in Yikol is also monomoraic.

Under this analysis of the glottal stop, the fact that only neutral vowel or its variant (the mid front vowel) occurs in the initial syllable of the derived word can now be explained in terms of co-articulatory effect: The constriction in the glottis in the production of the entering tone may cause the tongue body to be in a neutral position and hence the perceived neutral vowel accompanying the entering tone. This co-articulatory effect can be captured with the following constraint:

(20) Co-Articulation (Co-Art)

V
/ | \
If [CG], then [-high, -low -back] [CG] (A), in which A stands for articulation.

Presumably, this constraint will select any output which carries a neutral vowel realization in association with the entering tone. Note that this constraint does not require any crucial ordering with other constraints and applies only to Yikol. For example, given the input /pɑ+R/, we will have /pəʔlɑ/ as the optimal output. The following tableau demonstrates this evaluation:

(21) Neutral vowel in Yikol

	Co-Art.
a. .pɑʔ.lɑ.	*!
☞ b. .pəʔ.lɑ.	

4.4 Remaining issues

Thus far we have developed a constraint hierarchy capable of selecting a well-formed infixed word in either Fuzhou or Yikol:

(22) Constraint hierarchy

$$\left.\begin{array}{l} *COMPLEX, NoCoda, CONTIGUITY, (Co-Art) >> Alignment \\ PARSE, FILL >> *STRUCT \end{array}\right\} >> MAX$$

Note that the above constraint hierarchy has been constructed based on a few working examples. There are some remaining technical issues to be addressed here.

First, we have argued that the underlying representation is simply the affix R which has been claimed to bear a relation to the diminutive morpheme in Chinese dialects. In the above tableaus we have worked out so far, the actual surface form of the affix is not given. It should be understood, though, that the affix can be realized as either a retroflex [r] if syllable final or [l] if syllable initial or lateral retroflex if between a consonant and vowel. Such a phonetic realization of the same underlying representation, we claim, is language specific. Obviously, the affix will be realized as the lateral infix [l] in both Fuzhou and Yikol.

Secondly, we have refrained from offering an explanation about the mid front vowel [ɛ] associated with Yikol infixation. The realization of this vowel is clearly related to the medial high vowel observed in both the input and the output such as [i] in /tiɑu/ (*turn around*). The presence of the medial high vowel also challenges the constraint *COMPLEX we have proposed before. To appreciate this problem, we have to point out that the medial high vowel has a dual status in Chinese phonology. It has been argued in Bao (1990) and others that this medial high vowel is in fact both a vowel and a glide. (23) gives the syllable template when a medial high vowel is present (see (23) on the next page). With such a syllable structure, it is possible for the affix R to land between the onset [i] which is a glide and the moraic [i] which is a vowel. That explains why we have the surface infixed word for /tiau/ as /tiəʔliau/ in which [i] is present at both syllables. Under this treatment of the medial high vowel, it is possible for us to claim that the mid front vowel [ɛ] is again the result of the co-articulatory effect when any kind of vowel is inserted between the glide [i] and the glottal stop in Yikol.

(23) Syllable structure in Chinese

Finally, we have neither provided transcription nor discussed the tonal issue in L-infixation except for mentioning that Fuzhou would default to a falling tone 31 and Yikol 21. This, however, does not mean that tone will cause problems for our analysis. On the contrary, the tonal issue is not complicated at all. Remember that the two tones are default tones in the two dialects, respectively. Phonetically, they are both weak and short. In fact, it can be claimed that a weak and short tone can form a metrical foot with other surface tones which are louder and last longer. From this perspective, a further constraint has to be proposed to catch this prosodic template configuration.

5. Concluding remarks

In this paper, we have presented a preliminary analysis of the infixation process in two Chinese dialects. The major theme of the paper has been to motivate an Optimality-theoretic model which treats *fanqie* word formation as an infixation process. Specifically, we have argued that the lateral infix is related to an underlying affix which often manifests itself as a diminutive suffix [r] in most Chinese dialects. We have shown that this assumption will allow us to capture the generalization involved in the two seemingly different affixes.

Benefits of this study are two folds: On the one hand, the two issues concerning *fanqie* word formation are treated better in this study in that at least motivations are provided for the instantiation of both the infix and the partial reduplication phenomenon. On the other hand, the treatment of *fanqie* word formation as an infixation process modeled after the Optimality-theoretic perspective points to a possible approach to account for other word formation phenomena in Chinese morphology.

It should be emphasized here that the analysis as presented in this paper is far from being complete. We have not brought the retroflex-suffixation phenomenon into the foreground. It is hoped that future research can provide a more comprehensive and balanced treatment of this aspect of Chinese morphology.

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