

Chapter 6: Quasi-transparency

Thus far only stems in which either all or no vowels are neutralized have been considered. In this section the discussion will be expanded to include the more complex case of words in which other non-neutralized vowels precede the neutralized vowels.

In the introduction, brief mention was made of analyses of e and i in various Ural-Altaic languages as being 'transparent'. The term 'transparent' is used to suggest that harmonic processes 'see right through' such a vowel, regardless of its surface features, so that harmony-transmitting and harmony-receiving segments on opposite sides of such a vowel are able to share a harmonic value with which the intervening 'transparent' vowel is in apparent conflict.

In the Ural-Altaic languages, such transparency is primarily a side-effect of Fronting.¹⁸ It occurs in words in which the first vowel is [+Back], and the second vowel has become [-Back] at a point in the derivation after harmony has spread, at least according to rule-ordering solutions.

In Uyghur, apparent cases of this type of transparency regularly arise around the underspecified suffixal vowel ɪ (cf. examples in (12) and (13)). However, as has been argued before in this thesis, such

18. In the Tungusic branch of the Altaic language family, various neutralizations of the original front rounded vowels *ö, *ü are found (Poppe 1965, Vago 1973). Vago (1973) discusses a dialect of Turkish with the neutralizations ü → ɯ and ö → ɤ. Although it goes in the opposite direction from the neutralizations that are the primary focus of this thesis, this accords with the universal tendency (referred to in the introduction) toward the co-dependence of the features for backness and roundness in vowels, and resembles another universal default rule proposed by Archangeli (1984).

transparency is only an illusion caused by the interactions between Fronting and various other rules, so that the underlying patterns of harmony are actually quite simple, with harmonic values always transmitted to underspecified vowels from the immediately preceding vowel.

In searching through my primary database (Tohti 1986/1987) for examples that fit the pattern that produces transparency in certain other languages, I have found ten examples of stems with i in the final syllable and non-neutralized vowels in preceding syllables. These ten examples are presented below, categorized by whether they conform to the pattern predicted by the transparency analysis (25) or contradict it (26). (In accordance with my conclusion that the neutralized vowel i has the dual sources /i, ɤ/ in underlying representation, I have attempted to clarify these examples by showing the underlying values that I assume for i in the first columns of (25) and (26). In the derived forms, I have underlined the segments in stems and suffixes that superficially appear to be in harmonic agreement.)

(25) "Transparent" i in Stems with Other Vowels

| | | | | | |
|------------|-------------|--------------------|----|----------------------|------------------|
| /tajɤk/ | Tajik | + 1Ar | -> | <u>ta</u> jiklar | Tajiks |
| /tornɤk/ | bar | + 1Ar | -> | <u>to</u> rniklar | bars |
| /aktɤp/ | active | + 1 ^o G | -> | <u>ak</u> tipliɤ | activity |
| /pakɤt/ | fact | + GA | -> | <u>pa</u> kitɤ | to/for a fact |
| /tänqit/ | criticism | + GA | -> | <u>tän</u> qitkɤ | to/for criticism |
| /täqdir/ | fate | + DA | -> | <u>tä</u> qdirɤ | in fate |
| /mustäqil/ | independent | + 1 ^o G | -> | must <u>ä</u> qillik | independence |

(26) Non-transparent i in Stems with Other Vowels

| | | | | | |
|----------|----------|--------------------|----|--------------------|-------------|
| /mumkin/ | possible | + 1 ^o G | -> | <u>mum</u> kinlik | possibility |
| /äqɤl/ | wisdom | + 1 ^o G | -> | <u>ä</u> qillik | wise |
| /mantɤq/ | logic | + 1 ^o G | -> | man <u>t</u> qilic | logical |

These examples clearly conform neither to the patterns observed earlier in (19) and (20), nor to the transparency-type analyses of Uyghur that have been put forward by Poppe (1965) and Anderson (1974).¹⁹ Although it may be coincidental, it is true that all of the examples in (25) and (26) not only contain i in the last syllable, but also have either k or g (which we have observed to reflect harmonic values as per the correspondences set out in (4e)) in the part of the word following the last harmonically distinctive (i.e., non-neutralized) vowel. The difference between the examples in (25) and those in (26) is that the suffixes on the former set appear to harmonize with the vowels preceding i, while those in the second group appear to be in harmonic concord with the height feature of the back consonants. The only hypothesis that seems capable of handling the fundamental contradiction between the apparent patterns seen in (25) and (26) is the same hypothesis that has been argued for in previous sections of this thesis, namely that the vowels that surface as the neutralized vowel i have the distinctive values /i, ɤ/ in their underlying representations, and that they have become neutralized only late in their derivations through the effects of Fronting. Therefore, the underlying forms of the words in (25) and (26) must contain /i, ɤ/ in the distribution shown there.

19. Their analyses seem to have been done on the basis of written sources, which means that they were not exposed to the rich variety of allophones of i. I can only assume that they must have encountered examples of the type seen in (25), but not those in (26).

A word that appears from its spelling to defy all the normal patterns of harmony is *guṅšet* 'commune' (< Ch.) + *lAr* → *guṅšelar* 'communes'. However, the second vowel, although written *ə*, is clearly [ɤ] when pronounced, so this merely illustrates a minor gap in the orthographic system; [ɤ] is not an underlying sound in the native vocabulary. Although the spelling with *ə* is what is expected from Fronting, there is no rule of e-allophony to account for this vowel's surface features. It appears that this form is not fully integrated into the normal patterns of Uyghur phonology, and that continuing influence from the Chinese phonetic form of this word preserves intact the feature [+Back] of [ɤ] despite all appearances to the contrary in the orthography. That this vowel is an exception to Fronting argues against Fronting being a postlexical rule, since postlexical rules are predicted to be exceptionless.

It has already been mentioned that in words where harmonically distinct vowels are followed by back consonants in apparent conflict with them, harmony regularly is governed by the vowel (e.g., *xälq* 'people' + *I* + *GA* → *xälqigä* 'to/for its people', and other examples in (21)). On the other hand, in roots with only neutralized vowels, such as in (19) and (20), the harmonic value of the word always corresponds to that of the back consonant. The potentially 'transparent' types of words seen in (25) and (26) contain both harmonically distinct vowels (in syllables prior to the last syllable) and consonants that we have seen to be sometimes harmonically relevant. When we compare these examples, we see that in (25) the suffixes appear to harmonize with the

vowels, while in (26) they appear to harmonize with the consonants. In my analysis, these apparent sources for harmonic values that are underlined in (25) and (26) serve only as memory cues, and the actual source for the harmonic value that spreads is to be found in the vowels /i, ɨ/ in the final syllable, which must get their feature value for backness by lexical listing.

I conclude that the harmonic ambiguity produced by the neutralizing rule of Fronting acting in an environment where other cues for backness are contradictory must be resolved by lexical listing in Uyghur. Since exactly half (five) of the cases in my database contain /i/ and half contain /ɨ/, there is no obvious reason to think that one is preferred over the other, as there was when comparing words without any surface clues of the types illustrated in (17) and (22). Also, given that the patterns seen in the examples in (25) and (26) are identical (a harmonically distinct vowel is followed by both a consonant providing a harmonically contradictory clue and a neutralized vowel), I would predict that the harmonic nature of such words is inherently unstable and subject to reanalysis, so that different individuals would be particularly apt to assign differing harmonic values to such words. Of course disharmonic roots are prohibited by morpheme structure conditions in the native vocabulary, so all such words are loanwords.

Neither /i/ nor /ɨ/ in roots can be reconciled with a transparency analysis in the same way that /I/ can, as was shown earlier by the examples in (17) and (22), and now by the examples in (26). Although the

harmonic qualities of the words in (25) would appear to allow for a transparency analysis of Uyghur, the words in (26) clearly show that such an analysis is impossible, despite the (postlexical) neutralization of the final vowel by Fronting. I propose the term 'quasi-transparency' for this misleading interaction of various phonological processes.

6.1. Does Real Transparency Exist in Uyghur? (+ $\check{c}\bar{a}$ +) ¹

To this point, we have argued that root vowels are fully specified prior to any morphological or harmonic processes, contrary to the surface phonetic evidence that results from the postlexical operations of Fronting and i-Allophony. Further, we have argued that, although technically accurate, it is unenlightening to describe the harmonic patterning around the underspecified vowel \bar{I} as being transparency because the other underspecified vowels \bar{A} , \bar{O} and \bar{U} similarly transmit harmonic values, but there is no inclination to describe them as transparent because they manifest their harmonic features on the surface (except when $\bar{O} \rightarrow \bar{i}/\bar{I}$ by harmony, or when $\bar{A} \rightarrow \bar{a}/\bar{a}$ by harmony and then $\rightarrow \bar{i}/\bar{I}$ by Secondary Vowel Raising).

The classification of word-formation elements into such groups as stems, suffixes, clitics, etc. poses a number of problems (unresolvable here). Hahn (to appear b) argues that one way in which Turkic languages have evolved is by moving such elements from one category to another, one example being the interrogative marker that is still an invariant clitic $\pm\mu$ in Uyghur, but which has become a harmony-

sensitive suffix *mI* in Turkish.

Uyghur word formation includes several other types of elements in addition to the stems and the harmonizing suffixes that have been discussed to this point. It seems possible to distinguish several types of compounds in which stems are paired with each other; their typology is a complicated topic that must be left for another work, but one of their shared characteristics is that the conjoining of stems does not result in their changing so as to share any harmonic features, i.e., they are not underspecified. Another set of word-formation elements has been classified as clitics by Hahn (to appear b); they are added to words after all harmonizing suffixes and do not adopt harmonic features, so they occupy a more peripheral position, less integrated into their hosts than are suffixes. Somewhere in between these two groups lies a set of word-elements that are fully specified harmonically and that follow stems but precede harmonizing suffixes; a convenient label for them is 'non-harmonizing suffixes'. It may be appropriate to describe the word-element that we are about to discuss as straddling the line between non-harmonizing suffix and harmonizing suffix.

Uyghur has several homophonous suffixes with the shape +čä+. These perform a variety of distinct functions, including forming diminutives (kitap 'book' > kitapčä 'pamphlet'), language names (yapon 'Japanese nationality' > yapončä 'Japanese language'), comparison of size (öy 'house' > öyčä 'as (big as) a house'), estimative numbers (toqquz 'nine' > toqquzčä 'about nine'), etc.

It has been pointed out by Shinjang Uyghur Aptonom Rayonluq Millätlär Til-yeziq Xizmiti Komiteti (1985:25-27) that this suffix exhibits certain harmonic abnormalities. Its vowel, \ddot{a} , must be assigned the feature value [-Back] in underlying representation because it always surfaces with that value when word-final. (There cannot be a general rule assigning [-Back] to word-final low vowels because there are numerous roots ending in /a/ such as alma 'apple', and regular suffixes such as +GA+ and +DA+ often produce word-final /a/.) However, when any harmony-receiving suffix is placed directly after +čä+, its underlying feature value of [-Back] seems to vanish, and +čä+ behaves as if it were harmonically transparent, as may be seen from a small sampling of their examples.

(27) Transparent +čä+

| | | | | | | |
|----|----------|--------------------|--------------------|----|------------|---------------------------|
| a. | bağčä+ | park | +GA | -> | bağčiğa | to/for the park |
| b. | yamaqčä+ | small patch | +lAr | -> | yamaqčılar | small patches |
| c. | näyčä+ | small flute | +lAr | -> | näyčilär | small flutes |
| d. | zixčä+ | skewer | +GA | -> | zixčiğa | to/for the skewer |
| e. | oğulčä+ | like a boy | +lA- ^{ob} | -> | oğulčilap | done a boy's way |
| f. | koničä+ | in the old way | +rAK | -> | koničiraq | a little like the old way |
| g. | ğunčä+ | (unopened) blossom | +lAr | -> | ğunčilär | new blossoms |

Recalling that the environment for Secondary Vowel Raising (7) requires only that the target vowel be in an open syllable immediately followed by another (heteromorphemic) syllable, and given that Uyghur's syllable-structure constraints have essentially precluded suffixes from CC-cluster initials so that suffixes that produce new syllables normally do not close any preceding open syllables, it follows that the \ddot{a}

of +čä+ will be subject to Secondary Vowel Raising whenever it is followed by another word element (suffix or clitic), regardless of the phonological qualities of that element. In the normal course of things this would not be expected to disrupt harmonic processes, since raising does not disrupt harmony in derivations such as (10) or (15), and /ä/ would simply become the high front vowel /i/. Instead, somehow, the value [-Back] seems to get lost whenever +čä+ undergoes Secondary Vowel Raising. How can this possibly be explained?

One approach could be to assume feature-erasure, or some sort of special feature-changing rule. Prior to the development of underspecification theory and autosegmental theories of feature-spreading, it was common to assume that a suffix such as +GA+ must be either +ğä+ or +qa+ or +gä+ or +kä+ underlyingly, and then construct rules that would erase and replace or simply change its features in the proper environments. For a linguist who was working in such a framework, it might not seem unusual to have just one more feature-erasing rule, even if restricted to a single morpheme (or rather, set of homophones). However, given the assumptions of underspecified segments in suffixes and autosegmental spreading of feature values that underlie this thesis, it is otherwise unnecessary to assume feature-erasure. Also, given the importance of backness values in Uyghur's pervasive harmonic system, the introduction of a feature-erasure rule to cover this one suffix could result in major perturbations of the system if the rule began to broaden its scope. If suffixation can erase features in this suffix, why does it not erase features in others when they are suffixed? In

the interest of maintaining a constrained theory, or at least a constrained set of rule types for Uyghur, it seems undesirable to introduce a rule of feature-erasure solely for the suffix +čä+.²⁰

However, the alternative explanation which I can offer might also be said to raise problems for a constrained theory. The argument goes as follows. Uyghur possesses the highly productive suffix +čI+, which freely attaches to the -GU+ gerund to produce agent or actor names (cf. examples in (13)), and also productively attaches to many nouns (e.g., tiraktur 'tractor', tirakturči 'tractor driver').

Since all four homophones of +čä+ also attach to nouns, this latter use of +čI+ is not thereby distinguished from them morphologically. Since both +čä+ and +čI+ produce nouns that interact with the syntax identically, that does not keep them distinct. Semantically, each of the four homophones of +čä+ is somewhat different from the agent/actor meaning of +čI+, although some of the (lexicalized) uses of the diminutive +čä+ could come close to their range of meanings. The full range of suffixes that can attach to +čI+ can also attach to some forms with +čä+ (especially the diminutive +čä+). Thus, once +čä+ has been

20. It might be argued that Initial Vowel Raising and Secondary Vowel Raising erase the feature [+Low]. That would pose a problem for my argument here. I assume instead that those rules originated as assimilations, respectively, to [-Low] and [+High]; Initial Vowel Raising continues to operate as an assimilation rule, but the conditions on the environment for Secondary Vowel Raising have been weakened so that a [+High] vowel no longer needs to occur in the following syllable, which means that Secondary Vowel Raising no longer actually results in a height assimilation in many cases. Thus synchronically it has become more difficult to argue against Secondary Vowel Raising's being a feature-erasure rule rather than a feature-changing rule, although I would continue to do so.

suffixed (which automatically triggers Secondary Vowel Raising), the resultant form +č̣i+ is nearly indistinguishable in most respects from +č̣i+. (It will be recalled that, regardless of its harmonized value for backness, +č̣i+ becomes neutralized as /č̣i/ at the point in the derivation when Fronting applies to it, which further narrows the differences.)

I therefore argue that all of these morphological, syntactic, semantic, and phonetic congruences have led to the falling together of the phonological natures of these two suffixes when they are followed by other suffixes, even though they remain distinct when word-final. In other words, I argue that the cause of the apparent anomalous feature erasure affecting the value [-Back] in +č̣ä+ when it is followed by another suffix is simply a matter of analogization to the underspecified suffix +č̣i+.

Admittedly, it does seem unusual for analogy to play an active role of this sort in the course of derivations. However, analogy is known to play a role in diachronic morpho-phonological changes (cf. Anderson 1988), and there seems to be no principled reason to rule it out a priori in synchronic phonology. Furthermore, Uyghur phonology is permeated with analogical processes, considering that harmony is such a process. Therefore, I argue that +č̣ä+ regularly takes on the phonological nature of +č̣i+ by analogy when it is suffixed.

6.2. Exceptions to the Transparency of +čä+

It is further pointed out by Shinjang Uyghur Aptonom Rayonluq Millätlär Til-yeziq Xizmiti Komiteti (1985:26-27) that there exist four exceptions to the anomalous transparent behavior of +čä+ that we have just discussed. These consist of four deictics, which are given in (27).

(27) Non-transparent +čä+

| | | | | |
|--------|-------------|-------------|------------|------------------|
| ančä+ | anči + lik | 'that much' | anči + gä | 'to that extent' |
| qančä+ | qanči + lik | 'how much?' | qanči + gä | 'for how much?' |
| unčä+ | unči + lik | 'that much' | unči + gä | 'for that much' |
| šunčä+ | šunči + lik | 'this much' | šunči + gä | 'for this much' |

It is clear from these examples that the suffix +čä+ on these deictics does transmit the value [-Back] to any following suffixes. This is what would be expected from most word elements, but it forms an exception to the anomalously transparent behavior of +čä+ that was discussed in the previous section.

However, this is not the only case in which a Uyghur suffix behaves differently when attached to deictics. Uyghur possesses a suffix of qualitative comparison, +Däg+, whose vowel and final consonant normally are nonalternating and reflect an underlying [-Back] harmonic nature (e.g., taš+ 'stone' + Däg → taštäk 'like a stone'). After deictics, though, it harmonizes to the value [+Back], as though it were underlyingly +DAG+ with no specifications for backness, as can be seen in (28).

(28) Deictics with +Däg+

| | | | |
|--------------------|---------|--------|------------------------|
| bu+ ¹⁷ | 'this' | mundaq | 'in this way' |
| šu+ | 'that' | šundaq | 'in that way' |
| *qa+ ²¹ | 'what?' | qandaq | 'in what way?', 'how?' |

Although both +čä+ and +Däg+ exhibit anomalous harmonic behavior when suffixed to deictics, they do not exhibit the same behavior; +čä+ gains a harmonic feature [-Back], which cannot be deleted, whereas +Däg+ loses the feature [-Back]. A possible clue may lie in the old, non-productive nominal suffix +n+, which is found in all of the examples given in (27) and (28). Both the unproductivity of this suffix and the anomalous behavior of the other suffixes are typical of many phonological phenomena that have been linked to Stratum I derivatives in the lexical phonologies of other languages. (Another harmonic irregularity in Uyghur, a reversed harmonic pattern that might be attributable to a Stratum I derivation, also involves a deictic: bu 'this' + kün 'day' -> bügün 'today'.)

This chapter and previous ones in this thesis have illustrated many of the regular patterns of Uyghur, as well as a number of irregular and exceptional ones. The neutralizing rules of Fronting and i-Allophony, along with various other phonological rules, serve to complicate the picture. The question of how such a system can be acquired will be addressed in the following chapter.

21. The interrogative root *qa+ cannot appear alone without suffixes, but it appears in a variety of interrogatives, such as qa+ 'what' yärt+ 'place' +DA+ 'locative' -> qayärdä 'where?', qaysilar 'which ones?', etc.)

Chapter 7: Learnability -- The Three-stage Model of Language Acquisition

One of the clear results of the work in generative linguistics in recent decades has been the demonstration that a speaker's competence in a language depends not only on knowledge of numerous individual items such as words and other morphemes, but also on knowledge of various interacting systems of rules for manipulating those individual items. By identifying generalizations that apply to a number of individual cases, it is possible to lighten the burden on memory by remembering a single rule.

Research on human memory does not support the idea that all things can be remembered with equal ease. Chomsky (1965) discussed the problem of establishing an evaluation metric for grammars. He noted that a grammar may adequately describe a language in principle, yet in practical terms exceed human abilities as regards memory restrictions, time constraints, and limited and imperfect data. This led him to propose a further, more restrictive criterion for grammars, which he termed feasibility. As Wexler & Culicover (1983) restate the issue, "In our terms, feasibility may be called 'easy learnability,' that is, learnability from fairly restricted primary data, in a sufficiently quick time, with limited use of memory."

A question that must arise in regard to so complicated a system as the Uyghur vowel system, a system in which much of the information needed for the correct assessment of underlying feature values is distorted by irrelevant and misleading incidental factors such as Fronting

and i-Allophony, is the question of how such a system can be learned correctly by each new generation and propagated into the future. This is essentially the same as the question of feasibility or easy learnability. I believe that current theories of language acquisition can adequately account for the child's ability to acquire each of the patterns that have been discussed, as I will now attempt to lay out.

7.1. Stage 1

During infancy, frequently occurring words are stored in any form that is repeatedly encountered, whether that be a simple stem or an inflected word (cf. Kiparsky 1973a, Vago 1973:598, and articles by Perlmutter, Bybee, and especially Stemberger & MacWhinney in Hammond & Noonan 1988). For example, an infant exposed to standard English can be expected to have separate lexical entries for know, knew, known, knows, knowing, drink, drank, drunk, drinks, drinking, etc. At the earliest stage, no relationship between these forms need be recognized. It is at this time that the bulk of irregular forms are acquired, a set of words that roughly corresponds to Stratum I of the lexical phonology model. It seems feasible for an infant to learn these irregular forms within its constraints of time, memory and data, since the total number of such forms is quite low and many of them can be predicted to occur frequently.

In Uyghur, the irregular patterns and forms that must be internalized at this first stage include most of those in (17) that are lexically listed as [-Back], those in (18) that idiosyncratically take both

front and back harmony, those in (25) and (26) that exhibit quasi-transparency, some random forms with transparent +čä+, and various inflected forms of deictics (27), (28). It is an interesting fact that many of the Uyghur forms just listed may be translated into English by words that also are irregular and hence must be learned in infancy as well. Some of these may point to universals of the human condition.

At some point, of course, the attempt to remember individually every inflected form that is heard becomes an overwhelming burden, even for the best of memories. Fortunately, the child following the normal developmental path can find a degree of relief from this mental burden by progressing to the next stage.

7.2. Stage 2

At the second stage of language acquisition, children begin to recognize patterns in their language and attempt to employ them productively. This is the stage at which a child learning English will say 'drinked' and 'knowed', even though it may have said 'drank' and 'knew' previously, because it now begins to develop the concept of 'past', to realize that past tense and -ed correspond to each other, and to employ that correspondence even to the point of overgeneration.²²

22. Hoeksema (1986) made essentially this point regarding the acquisition of English 'strong' verbs by children. Citing Dresher's (1981) Learning Principles, he postulated that at this stage, "A learner adopts the most highly valued rules (i.e. rules requiring the fewest features) consistent with and sometimes even overriding, the available data." Further, he suggested that children's retention of the correct irregular forms even while they are producing incorrect regular forms is evidenced both by their later going back to the correct past tenses and by their continuing to understand adult speech.

In Uyghur, children at this second stage first must recognize the role played by various types of harmony in their language, i.e., they must realize that suffixal morphemes for 'plural', 'dative', etc. have two or more variants depending on the harmonic features of words when they are attached. This general recognition of harmonic processes should not pose any difficulties, since, as Vago (1973:582) observes, "processes like vowel harmony are in no way unnatural. On the contrary, all vowel harmony systems seem to be natural phonological assimilations." In fact, the frequency with which phonological assimilations of various sorts occur in diverse languages argues for their naturalness, if not an innate predisposition in that direction.

More specifically, we can isolate three ways in which children at this stage must come to recognize the patterning of harmony in Uyghur. These three realizations are a) that backness harmony affects the underspecified vowels (A, I, U, O), b) the relationship between G-allophony and backness harmony, and c) the lack of surface evidence for backness in neutralized vowels (i.e., the existence of Fronting and i-Allophony). Although it may seem somewhat abstract for a young child to realize the existence of these patterns, recall that the model posits that the child will have entered into its mental lexicon at the first stage various commonly occurring inflected forms, so that a variety of examples will be stored away that can be generalized from in order to reach each of these realizations.

Along with these overt harmonic patterns, children at this second stage must also recognize the generalization that many roots with

vowels that have been neutralized by Fronting take [+Back] suffixes for no evident reason. Since the pattern found in (22) is the dominant one for stems with neutralized vowels, it seems reasonable to predict over-generation here. It would not be surprising to find children at this stage using [+Back] suffixes inappropriately with the stems in (17) and (18), though they had not done so earlier.

It seems feasible for children to acquire these rules during the appropriate phase of early childhood, despite restricted time, memory and data, because the generalizations that they must recognize are inherently natural, and the rules that they must formulate are simple and straightforward within Uyghur's phonological system.

7.3. Stage 3 -- The Adult System

As it develops the adult system, the child must learn to strike the correct balance between the generalizations developed at stage 2 and the exceptional patterns stored in the lexicon at stage 1. This adult system for Uyghur speakers will include something resembling the set of statements outlined in (29), among others.

(29) Elements of the Uyghur harmonic system

- a. Underlying +/- High, +/- Round, +/- Back vowels exist. (I.e., the underlying vowel system is symmetrical and complete.)
- b. Backness harmony is pervasive within certain limits, although a variety of factors can obscure it. (I.e., harmony in words is regular, although the two vowel raising rules, Fronting, and i-Allophony contribute to neutralization, while compounded roots and clitics do not harmonize to stems they follow.)
- c. G-allophony closely corresponds to harmonic backness, with bidirectionality. (I.e., suffixal *g* always reflects harmonic

(29) Elements of the Uyghur harmonic system (continued)

backness unless immediately adjacent to another back stop; allophones of \underline{G} in roots consistently reflect harmonic backness when all vowels are neutralized (= (19), (20)), but non-neutral vowels in the final syllable take precedence (= (21)), while words with both \underline{G} -allophones and neutralized vowels that follow non-neutral vowels must have feature values of the neutralized vowels listed in the lexicon (= (25), (26).)

- d. Neutralized vowels are underlyingly [+Back] in the absence of contrary evidence. (I.e., the default rule (24) assigns [+Back] in the lexicon prior to any suffixation whenever it is not blocked by the Elsewhere Condition; neutral vowels are underlyingly front ([-Back]) only if marked as such by the velars /k, g/ (= (19)) or when listed as [-Back] in the lexicon (= (17) and parts of (18), (25) and (26).)

The interplay between the learning of lexically listed items at Stage 1 and the recognition of generalizations at Stage 2 leads to a complicated picture. Furthermore, we have noted that certain of the items that must be lexically listed as [-Back] are not likely to be part of a child's vocabulary, so adults must retain the ability to add to those lists. Nevertheless, this approach is both empirically and theoretically justifiable, and accounts for the data. No doubt other analyses are possible, but the inherent complexity of the problems involved will challenge anyone who would propose a simplistic solution. This analysis is abstract to the extent that it requires children to distinguish the underlying forms of certain vowels despite surface neutralizations. However, Uyghur is not unique in requiring such solutions. For example, Brame (1972) argues for an abstract analysis of Maltese Arabic / q /, and Hyman (1970:76) argues for abstract vowel neutralization in Nupe, asserting that "a child need not hear the phonetic

shape of an underlying segment to have stored it in his brain. The implication of this claim is that the child does not learn an abstract underlying representation solely from the phonetics of the individual morphemes (the extreme American taxonomic view), but rather has the additional ability to 'reason', instead of merely mimicking." Patterns of vowel harmony in Uyghur would seem to provide ample source materials for the child to work from as it develops its powers of reasoning and begins to search for clues to the underlying backness harmonic values of words. Although complicated, I believe that the system described here meets the standard of feasibility, or easy learnability.

Chapter 8: Summary of the Argument

In conclusion, let me briefly recap the argument. A cross-linguistic tendency to avoid mid and high back unrounded vowels has affected several Ural-Altaic languages in ways that may be described by the neutralizing rule of Fronting. In Uyghur, Fronting applies only postlexically, so it does not disturb the regular lexical operation of harmonic processes. A close correlation between the backness of vowels and the height of back obstruents functions to disambiguate numerous cases that would otherwise result in homophony through the complicated interactions of a variety of phonological rules. When present, the back obstruents provide a crucial insight into the backness value of underived stems that neutralized vowels are unable to provide. Elsewhere, in underived stems with neutralized vowels that lack back obstruents, either lexical listing as [-Back] is present (a small set of words) or [+Back] is assigned later in the lexicon by an innovative and productive rule of Uyghur. These feature values become part of the underlying representations of stems before they enter the morphology, where suffixation and harmonic processes occur. Thus, there is a paradoxical conjoining in Uyghur phonology of two productive rules ((24) and (2)), one of which assigns the value [+Back] in the lexicon to an open-ended set of roots of the class exemplified in (22), and the other of which systematically reverses these values to [-Back] later during their derivations. Looking at examples of the type seen in (25) might suggest that neutralized vowels are transparent in Uyghur, but the examples in (26) disprove that idea. The anomalous transparent

behavior of +čä+ is best attributed to the factor of analogy playing a rather abnormal active role in derivations by reshaping +čä+ with the features characteristic of +čI+.

A dialectical three-stage model of language acquisition can account for the transmission of this system, in spite of its complexity and variety of types of exceptions. A child begins with the thesis that each and every form is unique, and so must be individually remembered. Later it recognizes regularities of morphological patterning and takes the antithetical position that each and every form is morphologically regular. Finally, in progressing toward the adult system it must reach a Hegelian synthesis of these two diametrically opposed positions.

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