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Phonology I
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Assignment 2

# 1 Part I

Lexicon:

(1) a. /dalbuge/
b. /dibumpo/
c. /griluda/

Rules:

(2) a. labialization: [-labial] → [+round] / u _ V
b. color harmony: u → i / i $C_0$ _

If the rules in (2) apply simultaneously, the surface language will consist of /dalbug$^w$e/ (only labialization applies here), /dibimpo/ (only color harmony applies here), and /grilid$^w$a/ (both rules apply here).

If labialization applies before color harmony, the surface language will be the same as if both rules applied simultaneously: /dalbug$^w$e/, /dibimpo/, and /grilid$^w$a/. In the case of /griluda/, color harmony counterbleeds labialization because if color harmony had applied first, it would have turned the /u/ into /i/ and thus prevent labialization.

If color harmony applies before labialization, then the first two words will still surface as /dalbug$^w$e/ and /dibimpo/, but the third word will surface as /grilida/. Here, color harmony bleeds labialization.

# 2 Part II

The first set of data provided on singular and plural forms in Kasem is the following:

| | *singular* | *plural* | |
|---|---|---|---|
| a. | bakada | bakadi | 'boy' |
| b. | sada | sadi | 'grass matt' |
| c. | mimina | mimini | 'thin' |
| d. | fala | fali | 'white man' |
| e. | tula | tuli | 'granary' |
| f. | kukuda | kukudi | 'dog' |
| g. | fana | fani | 'knife' |
| h. | c'ana | c'ani | 'moon' |
| i. | bakala | bakali | 'shoulder' |

A very clear pattern emerges here. In each singular/plural pair, the two forms are exactly the same except that the singular form ends in /-a/ and the plural form ends in /-i/. Thus we might hypothesize that removing the final vowel in each of these words yields the root morpheme, to which either the singular morpheme /-a/ or the plural morpheme /-i/ can be added.

Next, we have the following data:

| | | | |
|---|---|---|---|
| j. | kambia | kambi | 'cooking pot' |
| k. | pia | pi | 'yam' |

Here, the singular forms /kambia/ and /pia/ would indicate that the roots are /kambi/ and /pi/, and yet the plural forms are /kambi/ and /pi/ rather than /kambii/ and /pii/ as our analysis would suggest. A possible explanation for the surface plural forms is that the language observes a rule for simplifying certain kinds of vowel clusters such that /ia/ is permitted but /ii/ simplifies to /i/. The following is one such rule that achieves this:

(3) Vowel Deletion: $V \rightarrow \emptyset$ / _ V[-back]

Vowel Deletion ensures that a vowel is deleted just in case it precedes a [-back] vowel (i.e., /i/ or /e/), thus ensuring that /kambii/ simplifies to /kambi/ and /pii/ simplifies to /pi/. Provided that /a/ is [+back] in Kasem, this rule will not affect /kambia/ or /pia/.

Given the current data, the environment constraint in this rule could have been anything that picks out /i/ but not /a/, e.g., _ V[-low] or _ V[+high], but the reason for using the [-back] feature will become clear as we consider more data.

Next, we have the following:

| | | | |
|---|---|---|---|
| l. | buga | bwi | 'river' |
| m. | diga | di | 'room' |

This data exhibits further complications. The singular forms /buga/ and /diga/ suggest that the root morphemes are /bug/ and /dig/, and so we would predict plural forms /bugi/ and /digi/, yet we see instead /bwi and /di/. Turning first to /bugi/ $\rightarrow$ /bwi/, there must be some rule that deletes /g/ before

/i/ but not before /a/. As with the previous rule, one feature distinguishing /i/ from /a/ is the [back] feature, and so we might write the rule as follows:

(4) Velar Deletion: C[+back] → ∅ / _ V[-back]

In Velar Deletion, C[+back] (i.e., any velar or uvular consonant) deletes before any front vowel, thus ensuring that /bugi/ becomes /bui/. Further data will be necessary to test the prediction that not just /g/ but any velar or uvular consonant deletes before a front vowel. Finally, we need a rule in order to ensure that /bui/ becomes /bwi/. Since [+round] is the feature that distinguishes /u/ from all the other vowels seen so far, we might posit a rule that round vowels strengthen to consonants when they precede vowels:

(5) Vowel Fortition (preliminary version): [+round] → C / _ V

Now, rule ordering becomes important. Velar Deletion must precede Vowel Fortition, so that the former feeds the latter in changing /bugi/ into /bui/ into /bwi/, and Vowel Deletion must go last so that Vowel Fortition bleeds it; otherwise, /bui/ would erroneously change to /bi/.

Turning now to the hypothetical underlying plural form /digi/, our three rules in the order just stipulated predicts Velar Deletion to yield /dii/, followed by Vowel Deletion to yield /di/, and this is exactly what the attested surface form is.

Turning to the next set:

| | | | |
|---|---|---|---|
| n. | malaa | male | ‘chameleon’ |
| o. | kabaa | kabe | ‘slave’ |
| p. | zizaa | zize | ‘grass roof’ |

In n–p, we hypothesize the underlying root morphemes /mala/, /kaba/, and /ziza/, yielding plural forms /malai/, /kabai/, and /zizai/. The surface plural forms, however, are /male/, /kabe/, and /zize/. A possible explanation for the presence of /e/ in the surface forms is that the /i/ in the underlying plural form has lowered to become closer in height to the preceding /a/; in other words, there is a height assimilation rule:

(6) Height Assimilation: V → [-high] / [-high] _

The effect of this rule will be to transform /malai/, /kabai/, and /zizai/ into /malae/, /kabae/, and /zizae/. Provided this rule applies before Vowel Deletion, it will feed Vowel Deletion to yield the surface forms /male/, /kabe/, and /zize/ as desired. Incidentally, we now see the logic behind formulating the Vowel Deletion environment constraint as _ V[-back]; this ensures that it will apply to /kabae/ and /zizae/, since /e/ is [-back].

Next we have the following:

| | | | |
|---|---|---|---|
| q. | laŋa | le | song’ |
| r. | naga | ne | ‘leg’ |

In q–r, the hypothetical underlying plural forms are /laŋi/ and /nagi/, and the surface forms are /le/ and /ne/. This will automatically follow from the rules formulated so far, provided that Velar

Deletion precedes Height Assimilation. Velar Deletion will yield /lai/ and /nai/ and feed Height Assimilation to yield /lae/ and /nae/, and finally, Height Assimilation will feed Vowel Deletion to yield /le/ and /ne/.

Turning to the next set:

| | | | |
|---|---|---|---|
| s. | pia | pe | 'sheep' |
| t. | babia | babe | 'brave' |

In s, we see the singular form /pia/ and the corresponding plural /pe/, which is puzzling because when we considered the same singular form /pia/ meaning 'yam', the plural form was /pi/. Thus in the case of /pia/ 'sheep', there must be some rule applying to the singular form that makes it look identical to /pia/ 'yam'. We know that the surface plural form must end in /e/, and we have already seen that the vowel sequence /ai/ yields /e/; thus we might hypothesize that the root morpheme is /pia/. This way, the underlying plural will be /piai/, and Height Assimilation yields /piae/. If the /a/ were to somehow delete to yield /pie/, then the Vowel Deletion rule would yield the correct surface form /pe/. Meanwhile, the underlying singular form is /piaa/, and in order to yield the correct surface form, one of the instances of /a/ needs to delete. The deletion of /a/ in both the singular and the plural forms can be handled if we posit a rule that deletes any vowel that occur between two other vowels:

(7) Tripthong Avoidance: $V \rightarrow \emptyset$ / V _ V

In the singular form, /piaa/ undergoes Tripthong Avoidance to yield /pia/, and in the plural form, /piai/ undergoes Height Assimilation to yield /piae/; this rule feeds Tripthong Avoidance to yield /pie/, and Tripthong Avoidance feeds Vowel Deletion to yield the correct surface form /pe/.

A parallel process occurs in the case of /babia/ and /babe/ as long as we posit that the root morpheme is /babia/. The underlying singular form /babiaa/ undergoes Tripthong Avoidance to yield /babia/, and the underlying plural form /babiai/ undergoes Height Assimilation to yield /babiae/, followed by Tripthong Avoidance to yield /babie/, followed by Vowel Deletion to yield the correct surface form /babe/.

Next we have:

| | | | |
|---|---|---|---|
| u. | nanjua | nanjwe | 'fly' |
| v. | yua | ywe | 'hair' |

The similarity of this data set to the previous one suggests similar underlying forms. In the case of /nanjua/ and /nanjwe/, we might posit that the underlying root morpheme is /nanjua/. This means that the underlying singular form is /nanjuaa/, to which Tripthong Avoidance applies to yield the correct surface form /nanjua/. In order to ensure that Vowel Fortition does not apply to erroneously yield /nanjwa/, however, we need to alter it slightly:

(8) Vowel Fortition (final version): [+round] $\rightarrow$ C / _ V[-back]

Now, Vowel Fortition applies only when the following vowel is [-back]. Since /a/ is [+back], /nanjua/ will not become /nanjwa/.

As for the underlying plural form /nanjuai/, the correct surface form is already predicted provided the rules are ordered correctly. Height Assimilation yields /nanjuae/, which feeds Tripthong Avoidance to yield /nanjue/, which feeds Vowel Fortition to yield the correct surface form /nanjwe/.

Similarly in the case of /yua/ and /ywe/: if the root morpheme is /yua/, then the underlying singular form /yuaa/ will undergo Tripthong Avoidance to yield /yua/, and the underlying plural form /yuai/ will undergo Height Assimilation to yield /yuae/, which feeds Tripthong Avoidance to yield /yue/, which feeds Vowel Fortition to yield the correct surface form /ywe/.

To recap, we have seen that Velar Deletion must precede Height Assimilation (as in q and r), which must precede Tripthong Avoidance (as in s–v), which must precede Vowel Fortition (as in u and v), which must precede Vowel Deletion (as in l):

(9) Velar Deletion: C[+back] → ∅ / _ V[-back]

(10) Height Assimilation: V → [-high] / [-high] _

(11) Tripthong Avoidance: V → ∅ / V _ V

(12) Vowel Fortition: [+round] → C / _ V[-back]

(13) Vowel Deletion: V → ∅ / _ V[-back]

These five rules applied in the order just presented is sufficient for capturing the last data set:

| | | | |
|---|---|---|---|
| w. | koga | kwe | ‘back’ |
| x. | c’oŋa | c’we | ‘path’ |

In w, the underlying root morpheme is /kog/, and so the singular form is /koga/. The underlying plural form /kogi/ undergoes Velar Deletion to yield /koi/, which feeds Height Assimilation to yield /koe/, which feeds Vowel Fortition to yield /kwe/ (and we now have further evidence that Vowel Fortition should apply to the set of [+round] vowels). Similarly, in x, the root morpheme is /c’oŋ/, and the singular form is /c’oŋa/. The underlying plural form is /c’oŋi/, which undergoes Velar Deletion to yield /c’oi/, which feeds Height Assimilation to yield /c’oe/, which feeds Vowel Fortition to yield the correct surface form /c’we/.

The chart on the next page summarizes how the five posited rules interact to produce the correct surface forms for all the data in j–x.

| Input | Vlr. Del. | Hgt. Assim. | Trip. Avd. | V Frt. | V Del. | Surface Form |
|---|---|---|---|---|---|---|
| kambi-a | → | → | → | → | → | kambia |
| kambi-i | → | → | → | → | kambi | kambi |
| pi-a | → | → | → | → | → | pia |
| pi-i | → | → | → | → | pi | pi |
| bug-a | → | → | → | → | → | buga |
| bug-i | bui | → | → | bwi | → | bwi |
| dig-a | → | → | → | → | → | diga |
| dig-i | dii | → | → | → | di | di |
| mala-a | → | → | → | → | → | malaa |
| mala-i | → | malae | → | → | male | male |
| kaba-a | → | → | → | → | → | kabaa |
| kaba-i | → | kabae | → | → | kabe | kabe |
| ziza-a | → | → | → | → | → | zizaa |
| ziza-i | → | zizae | → | → | zize | zize |
| laŋ-a | → | → | → | → | → | laŋa |
| laŋ-i | lai | lae | → | → | le | le |
| nag-a | → | → | → | → | → | naga |
| nag-i | nai | nae | → | → | ne | ne |
| pia-a | → | → | pia | → | → | pia |
| pia-i | → | piae | pie | → | pe | pe |
| babia-a | → | → | babia | → | → | babia |
| babia-i | → | babiae | babie | → | babe | babe |
| nanjua-a | → | → | nanjua | → | → | nanjua |
| nanjua-i | → | nanjuae | nanjue | nanjwe | → | nanjwe |
| yua-a | → | → | yua | → | → | yua |
| yua-i | → | yuae | yue | ywe | → | ywe |
| kog-a | → | → | → | → | → | koga |
| kog-i | koi | koe | → | kwe | → | kwe |
| c'oŋ-a | → | → | → | → | → | c'oŋa |
| c'oŋ-i | coi | coe | → | cwe | → | cwe |