Stretching ablaut: Morphological adaptation of new *CC*u* and *CC*i* stems in Moroccan Arabic

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1. Introduction[1]

As the result of regular sound changes, six noun and adjective stems of the shapes *CCu* and *CCi* made their appearance at some point in Moroccan Arabic. These shapes were quite unlike any existing stem shapes. Their final high vowels posed a problem for the morpho-phonology, specifically for the ablaut processes that produce plurals and diminutives from noun and adjective stems. However, plurals had to be formed, and with senses like 'pup', 'goat kid', and 'sweet' it was also necessary to provide for diminutives.

      This paper is about how plurals and diminutives were constituted in a wide range of Moroccan dialects, both Jewish and Muslim. The data are chiefly from fieldwork carried out between 1980 and 1986, in Morocco and in communities of ex-Moroccan Jews in Israel. The larger project culminated in a comprehensive dialectology (Heath 2002), but that volume omitted coverage of *CCu/CCi* stems and a handful of other topics that require separate, article-length treatment.

      The six key *CCu/CCi* stems were inherited from Classical Arabic (CA). It would be technically more correct to speak of proto-dialectal Arabic, but CA is a suitable proxy for this. The stems, in Sg form, are given in (1).

(1)	Gloss	CA (Sg)	MA (Sg)
a. nouns	'pup'	*jarw-, *jirw-	*žru, žṛu*
	'bucket'	*dalw-	*dlu*
	'goat kid'	*jady-	*ždi*
b. adjectives	'sweet'	*ħilw-	*ħlu*
	'clean'	*naqiyy-	*nqi*
	'fresh'	*ṭariʔ-	*ṭṛi*

2. The historical sound shifts

Two of the CA stems, *naqiyy- and *ṭariʔ-, already had second syllables with *i as nucleus. The CA glottal stop *ʔ was lost across the boards in MA, so the syllabic structure of *ṭariʔ- may have fallen together at an early stage with that of *naqiyy-.

In the four remaining cases, the CA stem was of the shape *CvCw- or *CvCy-. The notation *v denotes any short vowel from the set * { u, a, i). In CA, such stems were routinely followed by vocalic case suffixes (e.g., nominative). These vocalic suffixes disappeared without trace in MA. As a result, the final *w and *y were in a position favoring syllabification, regardless of whether the immediately preceding C was a sonorant or obstruent.

As a result of these processes, each of the six stems in question took the bi-syllabic shape *$<C_1 v>$ $<C_2...>$ with an initial short open syllable. In MA, a short vowel in this position regularly syncopated without a trace, resulting in *C_1C_2u and *C_1C_2i.

3. Non-syncopating North African dialects

The scenario described above is valid for most but not all dialects spoken within the traditional boundaries of Morocco. It is possible to distinguish three primary dialectal strands, reflecting the complex settlement history of the country.

(2)   a.   "Northern" type: northern Muslim dialects—Tangiers, Tetuan, and Chaouen; archaic Muslim dialects of the southern fringe of the Rif mountains; archaic Muslim urban dialects (Rabat, Fes, Sefrou, Taza); all Jewish dialects.

         b.   "Saharan" type: bedouin tribes of the far southern oases (Tata, Guelmine, M'hamid) and of the hinterlands of Rabat; very close to Hassaniya Arabic of Mauritania, Mali, and the Western Sahara.

         c.   "Eastern-central" type: dialects of the east (Oujda area), rural dialects of the central plains, and the urban dialects of Meknes and Marrakesh.

The northern type represents the oldest stratum, having taken shape in the Roman garrison towns (Volubilis, Tangiers, and perhaps Sale) after the Arab conquest. The Saharan type represents the massi ve influx of Arabian bedouin into the Maghreb beginning in the 11th Century. The eastern-central type is something of a hybrid of the two, with both bedouin and urban features but also a heavy Berber substratum, probably having taken shape initially in western Algeria.

Saharan dialects have fewer cases of *CCu/CCi* than do the others, due to lexical erosion (adjectives 'clean' and 'fresh') and also because syncope is less thoroughgoing *(dălw* 'bucket' and *žərw* or *žărw* 'pup'). In these dialects, the only case of *CCu* is the adjective *ntu*

'sweet', and the only *CCi* stem is the noun *ždi* 'goat kid'.

In North Africa as a whole, syncope in the relevant set of stems becomes more systematic going roughly from east to west. The examples in (3) are based on occasional data I have collected from informants, plus (for Algeria) some colonial literature.[2]

(3)

	'sweet'	'bucket'	'pup'	'goat kid'
a. no syncope				
Sudan (Khartoum)	*ħĭlw*	*dălw*	*žərw*	—
b. optional syncope for 'sweet'				
Libya	*ħəlw, ħluuw*	*dălw*	*žərw*	*žădy*
Tunisia (Gabès)	*ħəlw, ħluuw*	*dălw*	*žərw*	*žădy*
c. systematic syncope for 'sweet'				
Tunisia (Tunis)	*ħluuw*	*dălw*	*žərw*	*žădy*
Algeria (Ulad Brahim)	*ħluuw*	*dălw*	*žərw*	*žădy*
d. syncope for 'goat kid'				
Algeria (Oran)	—	—	*žərw*	*ždi*
Algeria (Algiers-J)	*ħluuw*	—	—	*ğdiiy*
e. syncope in all forms				
Algeria (Tlemcen)	—	"dlû"	*jrû*	*jdî*

Reading (3) top down, i.e., as the dialects go westward from Sudan and Libya to Algeria, we see that 'sweet' is the first to syncopate, then 'goat kid', though there are gaps in the dialectology (due in part to lexical erosion). We must be cautious with respect to the 'goat kid' data, since some cases of *ždi* may really involve /ždiyy/ or /ždəyy/. This is suggested by Algiers-J (Jewish Algiers) *ğdiiy,* with possessed forms like *ğdiiy-ək* 'your …' rather than *#ğdii-k.* Here we are probably dealing with an original Diminutive of *jădy, rather than with a syncopated reflex of the non-diminutive simplex. At any rate, by the time we get to coastal western Algeria (i.e., Tlemcen), syncope is systematic in all stems.

4. Adaptation strategies

The singular stems themselves posed no great phonological problem. The shape *CCi,* though new for nouns and adjectives, was familiar from imperfective verbs, directly inherited from the CA simple "weak" imperfective *-(a)CCii or measure IV causative imperfective *-u-CCii, as

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[2] Ulad Brahim: Marçais (1908). Algiers-J[ewish]: M. Cohen (1912). Tlemcen: Marçais (1902).

in MA *bki* 'weep' and *ški* 'complain', respectively.

The shape *CCu* was not as well-established. Many MA dialects have a single imperfective verb stem of this shape, namely *ħbu* 'crawl, walk on all fours'. However, Saharan dialects (and some others influenced by them) have imperfective *ħba* or *ħḅa*, and even the *ħbu* dialects generally have suffixally inflected perfective forms like *ħbi-t* 'I crawled' with iinstead of *u.* For a full MA dialectology of this stem, see Heath (2000).

The problem was, therefore, not with the singular shapes as such *(dlu, žru, ždi, ħlu, nqi, ṭri).* Rather, the difficulty was how to produce plurals and diminutives from them, given that there was no pre-existing system for feeding such inputs into ablaut derivation. In any such situation, three basic strategies are available, a priori:

(4)   a.   preserve the inherited derived forms (subject only to regular sound shifts), even though these forms may be archaic-looking;

       b.   replace inherited forms with entirely new derivatives, based on synchronic cutting-edge ablaut models;

       c.   compromise between (a) and (b) by applying "updates" to make inherited derivatives look reasonably up-to-date.

5. Plurals of CCu and CCi adjectives

We can dispense with the plurals of the adjectives *ħlu* 'sweet', *nqi* 'clean', and *ṭri* 'fresh' quickly. These stems take suffixal rather than ablaut plurals in MA: *ħluw-in, nqiy-in, ṭriy-in.*

The productive adjectival plurals are *CCaC* (for singulars of the *CCiC* adjective class, plus one instance of *CCuC,* namely *sxun* 'hot', Pl. *sxan* or *sʷxan),* and *CuCC* (for "color-defect" adjectives, Sg. shape *CCəC,* plus *ʕma* 'blind'). None of the *CCu* and *CCi* adjectives is of the "color-defect" type semantically or morphologically. They are arguably special cases of the regular *CCiC* (or *CCuC)* type; if so, we might expect a plural *#CCa,* i.e., *CCaC* minus the final *C*. However, the shape *CCa* is still in use as an elative *(ħla* 'sweeter') in some dialects, and since this directly reflects a CA weak elative type it is reasonable to think that *CCa* was not available for adjectival plurals.

6. Inherited plurals of *CCu* and *CCi* nouns

Things are quite different for the nouns. The original CA plurals are shown in the second column in (5). The third column shows the expected MA rtlexes, some of which are unattested (#).

(5)   CA Sg.   CA Pl   Expected MA Pl.   Gloss
       *jady-   *jidaaʔ-   *#žda*   'goat kid'

	*jidy-aan-	*ždy-an*	
*dalw-	*ʔadlii-	*(ə)dli*	'bucket'
	*dilaaʔ	*dla*	
	*ʔadlaaʔ-	*dla* or *(ə)dla*	
	(*ʔadliy-at-)	*#(ə)dlya*	
*jarw-/*jirw-	*ʔadjrii-	*#(ə)žRi*	'pup'
	*jiraaʔ-	*žRa*	("R" = *r* or *ṛ*)
	*ʔadjaaʔ-	*žRa* or *(ə)žRa*	
	*ʔajriy-at-	*#(ə)žRya*	

For 'goat kid', the only MA plural in common use is *ždy-an*. This type was not originally in use for 'bucket' or 'pup', for which we find a plural type *CCa*, in one case ('bucket') competing with *CCi*. The type *CCa* is actually composite etymologically, and in Saharan-influenced dialects it may still be possible to distinguish two forms (one with initial short vowel) on the basis of the phonology of the definite prefix, e.g., *d-dla* versus *l-ədla*. The original stem-initial vowel is lost in most dialects, but where still alive it prevents definite *l-* from assimilating to a stem-initial coronal consonant, and sometimes a belated syncope still leaves an unassimilated lateral *(l-dla)*. The plural variant *ʔajriy-at- has left behind no direct reflex (early MA *žrya would likely have been reinterpreted as a feminine singular). There may have been a parallel variant plural *ʔadliy-at- for 'bucket'.

7.   Productive MA nominal plural ablaut

Such plurals as *CCa* and *CCi* are isolated archaisms. Current productive MA nominal ablaut patterns for short ("triliteral") singular stems are in (6), though there are numerous lexicalized plurals that do not fit any such pattern.

(6)   Plural pattern(s)   Corresponding singular pattern

   a. CCuCa, CCaC   CəCC, CCəC
   b. CCaC   Cuc, CiC
   c. CiC-an   CaC
   d. CCaCi   CCC-a (feminine)
   e. CCaCa   CCCi, CVCi
   f. CCaC-at-   CəCC-t- etc. (female kin terms)

Examples: *kalb* 'dog', Pl. *kluba* or *klab; bir* 'well', Pl. *byar; faṛ* 'mouse', Pl. *fir-an; klw-a* 'kidney', Pl. *klawi; fas-i* 'Fessi (resident of Fes)', Pl. *fwasa, ʕmm-t-i* 'my paternal aunt', Pl. *ʕmam-at-i*.
        There are some *CCa* nouns in MA that potentially could have provided models for the ablaut pl uralization of the new *CCu* and *CCi* stems. However, in practice they are not helpful. Many *CCa* nouns have a suffixal plural: *mṛa-w-at* 'women' (alongside

suppletive plurals), *dwa-y-at* 'medications', *ṣla-w-at* 'prayers', *qfa-w-at* or *qfa-y-at* 'napes', *bṛa-w-at* 'letters'. *CCa* masculine verbal nouns like *kra* 'rental' are only awkwardly pluralizable. Most MA dialects preserve inherited plurals of the shape *CCi* only for *ʕṣa* 'stick, club' and *rħa* (or *ṛħa*) 'grinding mill', hence *ʕṣi* and *rħi (ṛħi)*. This *CCi* plural is isolated in the overall context of MA ablaut plurals, and even for these stems it has been supplanted in several other dialects, especially by the plural type *rħawi (ṛħawi), ʕṣawi*.

8. MA ablaut plurals of nouns (*ždi*, *dlu*, *žṛu*)

For *ždi* 'goat kid', in nearly all dialects the plural is the inherited *ždy-an* or a predictable variant (*žǝdy-an*, Jewish *zdy-an*, Twn-M *jǝðy-an*). An alternative *ždawi*, cf. (6d), was recorded only once each for M and J dialects.

The real problem was therefore the two new *CCu* nouns. They fit awkwardly into the patterns in (6), though each of the latter was utilized in one dialect or another. For 'bucket' and 'pup' the MA plurals that I recorded are organized into the sets in (7), excluding purely suffixal plurals *dlu-y-at / dlu-w-at* and *žru-w-at*. The forms within a set like (7a) have a family resemblance to each other, but the forms on different rows within a set have differentiating features.

(7) 'bucket' 'pup'

    a. *ădla* —
        dla *žRa, jṛa*
        dli —
        (inherited, now more common for 'pup' than for 'bucket'; *dla* was recorded once each in El Jadida-M and the oasis town Tata-M, and *ădla* with initial short vowel in Guelmine-M; *dli* was recorded twice in the oases (Guelmine-M, Tata-M) and once for Fes-M; *žRa* is dominant in the northern M dialects and along the Atlantic coast from Casablanca-M to Safi-M, less often in the oases; one questionable attestation of *dli* for Sefrou-J may be a Hebraism)

    b. *(ǝ)dlaw* —
        dla *(ă)žRaw*
        dlaw *žRaw*
        (mutates *CCa* of (7a) into the MA *CCaC* plural type, which conflates Classical *CiCaaC-* and *ʔaCCaaC-*, see (6a-b); this set is common in the southeastern (Tafilalt) M dialects, and attested in parts of the M urban belt; *ăzraw* and *ădlaw* with initial short vowels were recorded in the oasis town Tata-M; no J-dialect attestations of this set)

    c. *dlawa* *žRawa*

dlawi   *žRawi*

(further development of (7b) adding a final vowel, modeled on plurals of *CCC-a* and *CCCi* stems; see (6d-e); M distribution overlaps with that of set (7b) but attestations are less dense, with *dlawa* in the oasis town Tata-M, *dlawi* attested but sparse in the north (Tetuan-M, Chaouen-M), in coastal Azemmour-M, and in the oasis town M'hamid-M, and both *dlawa* and *dlawi* in Oujda-M; *dlawi* is common and widespread in J dialects, most strongly in the south, giving way to *dlawa* in the north- and southeast (Oujda-J to Tafilalt); *zRawa* is attested in northeastern J dialects and in Beni Mellal-J and Tiznit-J, while *žRawi* was recorded in southwestern Taroudant-J and El Keliia-J)

d.   *dlw-an*   *žRw-an*
       dly-an   *žRy-an*
       —   *i-žrw-an*

(analogy from *ždy-an* to *CCu* stems, as in some other dialects; in the case of 'bucket' perhaps also fed by an inherited dialectal *dalya* not in my data but reported by Prémare (1993); the shape *CCw/y-an* also occurs elsewhere in the morphology in the form of *CCw/y-an* verbal nouns; the Pl. suffix *-an* is also supported by Berber nominal plurals in *-an* or *-an* ; for 'pup' a similar plural is reported for Yemen-Dathina: *jiryaan* / *jirwaan* (Landberg 1905-13:1706, 1920-42:280); attestations: *dlw-an* is regular in Marrakesh-M and fairly common in the oases with a few attestations farther north; *dlw-an* also occurs in some eastern J dialects and is recorded for Fes-J and Essaouira-J; *dly-an* is uncommon but attested here and there in the same general area; *ZRw-an* has the same basic distribution in M dialects as *dlw-an* but is additionally regular from Fes-M and Sefrou-M to Taza-M and in the Rifi villages; *f,rw-an* also in Debdou-J (east); Berberized *i-zrw-an* for Toulal-J in the southeast; *zry-an* occurs sporadically in the M oasis dialects and was attested once in Souk Larba-M)

e.   *dlula*   —
       dluwa   *žruwa*

(sporadic recourse to *CCuCa*, the productive MA plural for strong triliterals, but rare and awkward when $C_3 = w$, note the doubling of input C_2 in the variant *dlula* ; distribution: *dlula* has three scattered M attestations; *dluwa* once each in M'hamid-M and Azemmour-M ; *žruwa* once each in Azemmour-M and Oujda-M)

f.   *dlaw-at* (*-aθ*)   —
       —   *žraw-in*
       —   *žriw-an*

(has medial *a* due to ablaut, as in (7b-c), but adds a Plural suffix; *CCaw-at* may have been a mutation from *CCawa* (7c), perhaps influenced by *CCaC-at* feminine kin-term plurals such as *ʕmam-at-* 'paternal aunts' from Sg. *ʕəmm-t-* ; *dlaw-at* is moderately common in the M north and in Meknes-M and is attested in Oujda-M and

Safi-M; it is usual in Rabat-J and attested in Meknes-J, Casablanca-J, Beni Sbih-J, and Debdou-J ; *žraw-in,* recorded once in Oujda-M, reflects a minor ablaut-suffixal pattern *CCaC-in* seen also in e.g., Pl. *ḍyaf-in* 'guests' from *ḍif,* while Berber-influenced *žriw-an* was recorded once for Sefrou-M)

g. *dlw-at*   —
    (rare pseudo-f.pl., attested Aoulouz-J, probable mutation from **dlw-a* or **dlw-an*)

h. *dlaym*   —
    (rare, Hebraized, attested once Oujda-J)

One can imagine stepwise historical sequences like those in (8), each mutation involving a slight phonological increment or substitution. However, the constant potential for dialect mixing and the ready availability of analogical models for the fuller plurals would have permitted "jumping" over intermediate stages.

(8) a. *CCa >*   *CCaw >*   *CCawa >*   *CCaw-at*
         (7a)   (7b)   (7c)   (7f)
     b. *žra >*   *žraw >*   *žrawi >*   *žraw-in*
         (7a)   (7b)   (7c)   (7f)
     c. *dlw-an >*   *dlw-at*
         (7d)   (7g)
     d. *žrw-an >*   *i-žrw-an*
         (7d)   (7d)

9. *Productive MA nominal and adjectival diminutive ablaut*

The diminutives of nouns and adjectives are based on slightly distinct ablaut templates that can easily be confused. The basic nominal diminutive pattern is *CCiCX**, with a rigid *CCiC* onset (dialectally *CwCiC)* followed by a tail X* of variable shape, but obligatorily non-null and extendible to more than one segment. For long input noun stems, the first few segments of the input fill t he consonantal positions of *CCiC.* Then what is left of the input stem (i.e., its rightmost segment or segments) is transferred onto X*, with some modifications, notably to an input non-final full ("long") vowel that immediately follows the cut-off point. In northern-type dialects including the J dialects (2a), this vowel is reduced to schwa in X*, and in some dialects can be syncopated. In Saharan dialects (2b), and (probably under their influence) most eastern-central type dialects (2c), the input full vowel remains full but shifts to *i*. For example, *brrad* 'tea kettle' has these diminutive variants: "northern" *brir(ə)d,* elsewhere *birid.* Except for the first vowel, these diminutives resemble non-diminutive quadriliteral Pl. *brar(ə)d* and *brarid*, respectively, but the dialectal distribution of Pl. *brarid* is much narrower than that of *birid,* undoubtedly because of the sound-symbolic value of repeating the *i*-vowel in the diminutive (cf. *teensy-weensy,* etc.).

When the input to nominal diminutive *CCiCX** is too short to provide segments to fill both output C_3 and X^*, the final input segment normally transfers to X^*, leaving output C_3 to be filled by a non-lexical filler. For noun stems, this is *w* or *y,* sometimes geminated to *ww* or *yy.* For example, *kəlb* 'dog' has diminutives like *kʷliyyəb.*

In early MA, the diminutive of adjectives may well have been very similar to that of nouns, but with a smaller range of input shapes. The basic adjectival shapes are *CCiC* for adjectives of quality and state (we may add *sxun* 'hot' with *u),* and *CCəC* (Saharan *ăCCăC*) for adjectives of color and defect. In both cases, the dominant MA diminutive is $CC_xiC_x(ə)C$, which could be regarded as a special case of the nominal diminutive *CCiCX** (the next section will demonstrate that this is no longer synchronically correct). However, adjectival diminutives are often of the output shape $CC_xiC_x(ə)C$ with input C_2 doubled (appearing as output C_2 and C_3). Specifically, C_2-doubling is standard in color- defect adjectives and occurs at least dialectally with many quality-state adjectives: *kħəl* 'black', dimin. *kwħi(ə)l,* and *kbir* 'big', dimin. *kʷbib(ə)r.* We will see just below that C_2-doubling is a feature of diminutives of *CCu* and *CCi* stems, not only for adjectives (where we expect it) but also for nouns. This most likely reflects interaction between *CCu / CCi* nouns and *CCu / CCi* adjectives, since there are almost no cases of C_2-doubling in other nouns (the only clear case is northern dialectal *mwim-a* 'a little bit of water' from *ma* 'water', where the input has only one consonant; in some dialects, *m̩m̩im-t-* 'mother-dimin.' from *m̩m̩-* may be best analyzed as another instance).

The dimin. C_3 is sometimes secondarily geminated (=lengthened). This jumps out in dialectal forms like *kʷbibb(ə)r̩* 'big-dimin.'. It is probably much more widespread, though harder to hear, when dimin. C_3 is *y,* as in *ṣɣiy(y)(ə)r̩* 'small-dimin.' from *ṣɣir̩* (cf. the more easily audible gemination in Hassaniya *sɣăyyăr.*

In the purer Saharan dialects, an entirely different diminutive (m.sg. *CăyCăC* or variant) is used with color-defect adjectives.

Diminutivization ranges from extremely productive (Saharan) to quite productive (central-eastern) to fairly productive (northern dialects). However, the inherited system gave few clues as to how to diminutivize the new *CCu* and *CCi* stems. The major morpho-phonological issues were: (a) whether the final input high vowel was mapped onto output C_3, output X^*, or not at all; and (b), since C_3 and X^* must be non-null, how they are filled. Speakers of early MA would have sought guidance for how to diminutivize *CCu* and *CCi* by looking at what happened with *CCa* stems.

The only *CCV* nouns subject to diminutivization, prior to the emergence of *CCu* and *CCi* stems, were of the shape *CCa.* However, the fact that some of them were always feminine, others variably feminine or masculine (depending on dialect), and still others always masculine, made the data difficult to interpret. Gender is not an issue in ablaut plurals, but it is very relevant to diminutives, which often overtly express f.sg. suffix *-a* even when the input noun is "covertly" feminine (revealed only by agreement and concord): *ħanut* 'shop' (covertly feminine: *ħanut kbir-a* 'a big shop'), dimin. *ħwinit-a* (with overt f.sg. suffix). For *mr̩a* 'woman' we get diminutives like *mr̩iw-a* and *mr̩i(y)y-a* (sometimes differentiated semantically, with one being used as an insult directed at men). For *ʕṣa* 'stick, club', covertly feminine in most dialects, the usual diminutive is *ʕṣiw-a* or *ʕṣi(y)y-a.* None of the consistently masculine *CCa* nouns (such as verbal nouns) seems to have a high-frequency diminutive. The new *CCi*

and *CCu* nouns were therefore on their own.

Likewise, the only *CCa* adjective in MA is *ʕma* 'blind'. I found it difficult to elicit a diminutive for this stem, partly because of the respect accorded to the blind in Moroccan culture. *ʕma* is often supplanted entirely by *ʕwəṛ* (original sense 'one-eyed'), and in cultivated speech by *bṣir* (an antonymic taboo replacement originally meaning 'clear-sighted'). So the new *CCu* and *CCi* adjectives would have gotten sparse help from *ʕma* in creating their diminutives.

10. MA diminutives of nouns (dlu, žru, ždi)

The many variant diminutives that I recorded for the *CCu* and *CCi* nouns are presented in (9). For most Jewish dialects except those in the east (e.g., Oujda), "*ž*" is really *z* due to merger of palatoalveolar and alveolar sibilants.

In certain rows, two sets of diminutive fonns for *ždi* (one with *w,* the other with *y*) are displayed side by side. In such cases the *w* variant (e.g., *ždiww)* has exactly the same form as a diminutive of the *CCu* stems except of course for the initial cluster *(ždiww, dliww, žriww).* In such a dialect, the output *w* is not dependent on an input *u,* and is either a non-lexical filler or the result of phonological conflation of the two semivowels. By contrast, when *y* occurs (e.g., in *ždiyy)* in a pattern where the *CCu* stems have *w* (e.g., *dliww, žriww*), we have a dialect that clearly maps the lexical high vowel *u* or ionto the output consonant (here C_3) position.

In (9a-c), we observe C_2-doubling, the input C_2 appearing both as dimin. C_2 and either dimin. C_3 (9a-b) or C_4 (9-c). These C_2-doubling patterns are almost certainly an extension to nouns of the regular adjectival pattern (see the following section).

(9)　　　'bucket'　　'puppy'　　'goat kid-1'　'goat kid-2'

a. *dluw(w)l*　　—　　　　—　　　　　　—
　　dliw(ə)l　　—　　　*ždiwəd*　　　　—
　　dliwwəl　　—　　　　—　　　　　　—
　　dliy(y)əl　*žṛăyyăṛ*　　　—　　　　*ždiyəd*
　　(input C_2 spreads to dimin. C_2 and C_4 ; dimin. C_3 is either mapped from input V, or default; distribution: *dliwl* is the only widespread form, occurring in and near the main urban belt: Chaouen-M, Meknes-M, Fes-J, Beni Mellal-J, Souk Larba-M, Taounate-M, Oujda-M; for 'puppy', *žṛăyyăṛ* once Casablanca-M; for 'goat kid', eastern *ždiyəd* attested once in Oujda-M and northern *ždiwəd* attested once each in Chaouen-M and Tangiers-M, but none of the speakers in question had diminutives from this set for 'bucket' or 'puppy ')

b. *dlil*
　　(infrequent reduction of (9a), attested once Marrakesh-M)

c. *dlili*　　　—　　　*ždidi*　　　　　—

dlilu	žRiRu	ždidu	—

(input C_2 spreads to dimin. C_2 and C_3; dimin. V_2 is variably copied from the input V, or templatic; this set is concentrated in and near the middle of the urban belt: Fes-M, Sefrou-M, and Taza-M; *dlili* once Casablanca-M, versus much more common *dlilu* ; *ždidi* likewise once each Fes-M and Sidi Kasem-M, versus more common *ždidu*)

d.
dliww	žriww	ždiww	—
dlew	žRew(w)	—	ždey(y)
dliw	žRiw	ždiw	—
dliwu	žṛiwu	—	—
dliy(y)u	žriy(y)u	—	ždiyyu
dliyyăw	—	—	—
—	—	—	ždayu

(no input-C_2 spreading; various treatments of ending, including non- lexical semivowels and mappings from the input; the forms ending in *w(w)* and *y(y)* are common in the southern oases, along the Atlantic coastal towns south of Casablanca, and around Rabat-M ; *dliwu, dliyu,* etc. are phonetically slight adaptations; Saharan-looking *dliyyăw* once Zagora-M; for 'goat kid' *zdiw(w)* was recorded in El Jadida/ Azemmour-M, Souk Larba-M, and Tafilalt-M, while the other oasis dialects-M have *ždew* and *ždey(y); ždayu* once Safi-M)

e.
dliwi	žRiwi	ždiwi	ždiyi

(related to (9d), vocalism templatic, dimin. C_3 either a non-lexical semivowel, or mapped ; this set is densely attested in northern dialects (Tangiers-M, Tetuan -M, Chaouen-M, Ouazzane-J) and for Oujda-J, *dliwi* also Meknes-J, *žRiwi* and *ždiwi* also sporadically elsewhere; *ždiyi* once each Chaouen-M and Oujda-M; an ablaut diminutive plural *ždawa* was recorded for Oujda-J)

f.
dliw-a	žRiw-a	—	ždiw-a

(feminine in form; *CCiw-a* is the regular dimin. of f.sg. input *CCw-a* or *CCy-a* ; *dliw-a* is very common in J dialects of the Atlantic coast (Casablanca south) and the entire south, and is also attested Tangiers-M, Ouarzazate-M, Zagora-M, Rissani-M; *žRiw-a* has a fair number of attestations, but it is primarily the dimin. of *žRw-a* 'bitch'; *ždiw-a* (Meknes-M, Azemmour-M), variant *jdiw-a* (Tangiers-M), and scattered J dialects with *zdiw-a* ; some speakers use such forms only in the f.pl. with *-at*)

g.
dliwn	—	—	—

(incorporates *n* from Pl *dlw-an,* perhaps as a mutation from *dliwl;* attested once Marrakesh-M)

h.
—	žwiyṛ	—	—

(looks like (9a) but with input C_2 linked only to dimin. C_4 ; attested once, Marrakesh-M)

11. MA diminutives of adjectives (*ʕma, ħlu, nqi, ṭri*)

Adjectival diminutives from my data, including very limited data from *ʕma* 'blind', are given in (10). I did not usually elicit these forms from Jewish spcakers so my information is largely limited to Muslim dialects. Of the *CCV* adjectives, *ħlu* 'sweet' clearly plays the central role here. Its sense lends itself to hypocoristic) diminutivization with human reference, just as in English *sweetie,* cf. *sweatheart, my sweets,* etc.). For El Jadida-M I recorded a nominal use *ħlillu* 'water drunk on the second day of the Feast of the Ram'.

In some rows, I have again placed *w* and *y* variants for the diminutive of *nqi* side by side, where the *w* variant suggests a non-lexical (or phonologically merged) semivowel and the *y* variant points to mapping of the lexical high vowel onto an output C position. Since the limited data for *ṭri* 'fresh' generally track those of *nqi,* the former are omitted except where they flesh out a set.

(10)

	ʕma 'blind' (dimin. rare)	*ħlu* 'sweet' (dimin. common)	*nqi* 'clean-1'	*nqi* 'clean-2'
a.	—	*ħlilu*	*nqiqu*	
	—	*ħlillu*	—	
	—	*ħlullu*	—	
	ʕmimi	*ħlili*	*nqiqi*	
	—	*ħlilwi*	—	
	—	—	*nqiqqiw*	

(input C_2 spreads to dimin. C_2 and C_3; vocalism is partly templatic; regular suffixal forms of type f.sg. *ħlilw-a,* Pl. *ħlilw-in;* this set is generally dominant for M dialects of the north and the main urban belt, and attested in Marrakesh-M; the usual forms are *ħlilu* and *nqiqi,* with rarer attestations of *ħlillu* ~ *ħlullu* once Marrakesh-M, *ħlili* once Safi-M, *ħlilwi* once Casablanca-M, *nqiqu* once in Taza-M and once in a nearby Rifi village Taounate-M *(ṭriṛu* 'fresh-dimin.' has a similar distribution), *nqiqqiw* once Erfoud-M; *ʕmimi* was recorded once in Oujda-M)

b.	—	*ħliw*	*nqiw*	*nqiy*
	—	—	*nqew*	*nqey*
	ʕmiww	*ħliww*	—	—
	—	—	*nqeww*	
	—	*ħliy(y)u*	—	—
	—	*ħliyyăw*	—	—

(no spreading of input C_2; dimin. C_3 is either mapped from the input vowel, or is a default *w;* this set is common in Atlantic coastal towns from El Jadida/Azemmour

to Safi, and in the southern oases)

c. *ʕmiwi* — *nqiwi*
(no spreading of input C_2; Dimin C_3 default *w; ʕmiwi* attested once Rissani-M, *nqiwi* attested several times in the north: Tangiers-M, Tetuan-M, Chaouen-M)

d. — *ħlayu* *nqayu*
(occasional development of (b) with medial V dissimilating to *a ;* both forms recorded for one Safi-M speaker))

e. *ʕmiym* *ħliwl* *ṭriwṛ* *nqiyəq*
   ħliwwəl *ṭriyyəṛ*
(input C_2 spreads to dimin. C_2 and C_4 ; dimin. C_3 usually patterns as a default *w* or *y;* distribution: *ħliwl* is regular in Oujda-M (east) and recorded around Marrakesh-M and Ouarzazate-M, and for Fes-J and Sefrou-J, while geminated *ħliwwəl* was recorded once each for Meknes-M and Rabat-M; *nqiyəq* once Ouarzazate-M, likewise *ṭriyyəṛ* 'fresh-dimin.' for one Marrakesh-M speaker; *ṭriwṛ* for one Oujda-M speaker who also gave *nqiqi, ħliwl,* and *ʕmiym – ʕmimi*)

f. *ʕăyma* *ħăylu* — —
Hassani ya-type "color-defect" m.sg. dimin. pattern *CăyCə/ăC,* recorded once in the oasis town Tata-M)

12. Modeling issues I: Creeping quadriliteralization

A formal model of MA plural and diminutive ablaut was presented, for a mainstream koine-ized Muslim dialect (Fes-Meknes area), in Heath (1987). Outputs are constituted by selectively mapping input stem segments onto templates that generally have vacant C positions and pre-specified V positions, and in some cases end in a variable tail.

The nominal plural data given above bring out a historical trend to upgrade triliteral to (pseudo-)quadriliteral stems for ablaut purposes. Elsewhere in MA, this is most clearly seen in the treatment of (feminine) *CCC-a* and *CVC-a* nouns, and of (masculine) *CCCi* and *CVCi* nouns (including *-i nisba* adjectives used as nouns). For such stems, the final stem vowel is now counted as a full segment, so instead of typical strong triliteral plurals we normally get a quadriliteral plural based on *CCaCX*,* as in *qrʕ-a* 'bottle', Pl. *qraʕ-i* and *sbsi* '(smoking) pipe', Pl. *sbasa* (within X*, input *i* and *a* are normally switched).

This upgrading has spread (dialectally) to *CCV* nouns *(CCa,* plus the new *CCu* and *CCi* stems), resulting in plurals of the shape *CCawi* (or *CCawa),* see (7c) and the end of Section 7 *(rħawi, ʕṣawi).* (7c) gives both *CCawi* and *CCawa* plurals for *CCu* noun stems. The type *dlawi, žrawi* matches the most common quadriliteral-type plural for *CCa* stems *(rħawi, ʕṣawi),* and suggests that these, along with the feminine type *CCC-a,* were the primary analogical models. On the other hand, the type *dlawa, žrawa* with final *a* is

what we would expect (given the *a/i* vowel-switching rule within X*) if input *u* were treated like its fellow high vowel *i,* as seen in *sbsi* 'pipe', Pl. *sbasa*.

(11) a. d   l   u (≈ a)   b. d   l   u (≈ a)

      | | |(a/i switching) | | |(a/i switching)

      C   Ca C   X*   C   Ca   C   X*

                | |

               w   w

          output: *dlawi*   output: *dlawa*
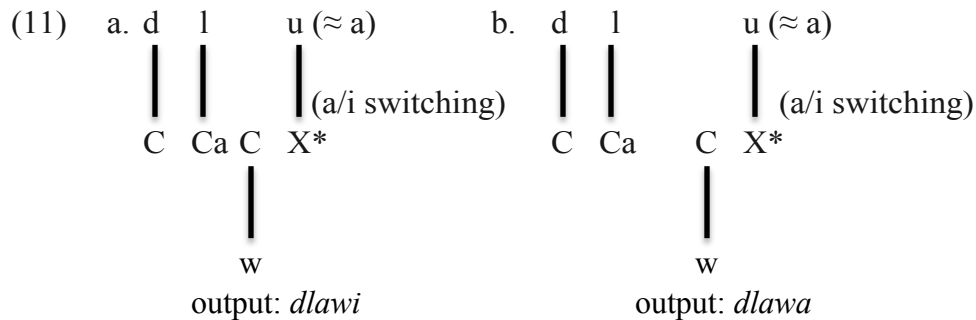
13. Modeling issues II: C$_2$-doubling

The diminutive data for *CCu* and CCi adjectives (lOa, f) show extensive C$_2$-doubling (i.e., mapping onto two output C positions, or C and X*, with at least one intervening segment). This is expected, since C$_2$-doubling is productive in other adjectival diminutives, especially in the color-defect class. More surprising, we also observe considerable C$_2$-doubling in diminutives of *CCu* and *CCi* nouns (9a-c). C$_2$-doubling is substantially absent in ablaut plurals of these same nouns; Pl. *dlula* (7e) is a rare and isolated example.

    The two basic mapping strategies involving C$_2$-doubling can be illustrated with the diminutives in (12).

(12) a. d   l   u   b. d   l   u

      | /\ | | /\

      C   Ci C   X*   C   Ci   C   X*

                                                 |

                                                 w

          output: *dlilu*   output: *dliwl*
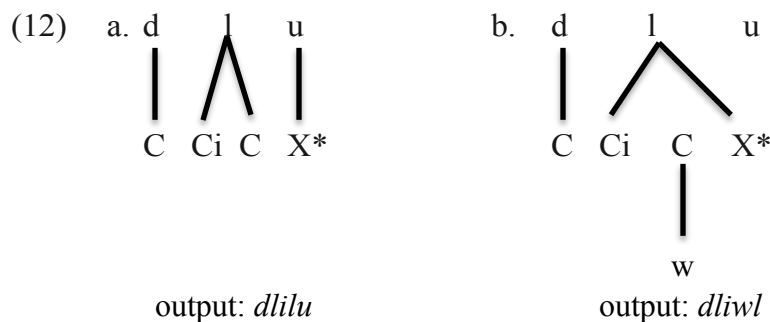
(12a-b) show how the same input can combine with the same template in different ways depending on how the mappi ngs are constrained. In both cases, the requirement that X* be non-null is satisfied. In the more straightforward (12a), this involves transferring the stem-final *u* to X*. After dimin. C$_1$ and C$_2$ are filled (*dl*...), dimin. C$_3$ remains vacant. It could be filled by a non-lexical semivowel *y* or *w,* and indeed *dliyu* and *dliwu* (among other variants) are attested dialectally (9d). However, in other dialects with *dlilu* and similar forms, input C$_2$ is doubled on dimin. C$_3$. In (12b), the stem-final *u* is not transferred to X*. Instead, the double of input C$_2$ is transferred into X*, leaving dimin. C$_3$ to be filled by a non-lexical semivowel.

One can easily imagine a variation on (l2b) such that the dimin. C_3 *w* is in fact lexical, being mapped from the stem-final *u*. This would be the correct analysis in any dialects where we got *w* from stem-final *u* but *y* from stem-final i*(dliwl, ždiyd)*. None of my informants clearly displayed such a dialect, but it would be worth looking farther. Of course such a dialect would involve "crossing" of C-to-C and V-to-C association lines, a phenomenon observable in Sierra Miwok (Smith 1985).

A more extreme mapping is the rare variant *žwiyṛ* (9h) from *žṛu*. Here input C_2 is transferred to X* but is not mapped onto dimin. C_2 or C_3, leaving both of these positions blank until non-lexical semivowels are inserted.

14. Maps

The schematic "maps" in the appendix show the distribution of the key variant types for Muslim dialects (the data are too sparse for Jewish dialects to make mapping useful). The maps are of the same type used in Heath (2002) and are mainly for Moroccan specialists. The large squares are, from left to right: (a) top row: Tangiers, Tetuan; (b) middle row: Rabat, Meknes, Fes, Taza, Oujda (I frequently refer to the Rabat-Taza sequence as the "urban belt"); (c) lowest row: Marrakesh. The circle and the three triangles roughly above Taza are the Arabic dialects of the western flank and southern fringe of the Rif. The three triangles above Rabat-Fes are rural-type dialects. The three circles and one triangle in the left center are the Atlantic coast communities from Casablanca to Safi. The triangles in two rows on the bottom are the oasis dialects, including Tafilalt (Erfoud, Rissani) at the far right. Shading indicates the density of the variant in question, e.g., 2 out of 5 informants =40% is shaded less densely than a higher percentage.

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Maps 1-6: Adjectival diminutives

1. *ħliw(w), ħlew(w)*
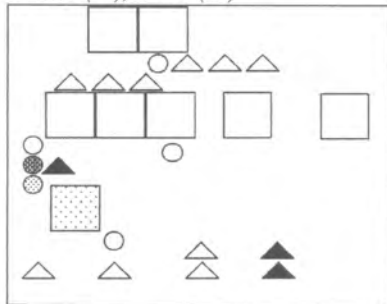
2. *nqiw(w), nqew(w), ṭriw(w), ṭrew(w)*
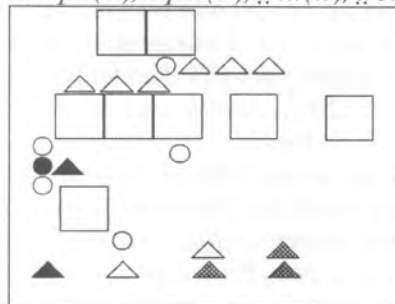
3. $C_3=C_2$ *ħlilu (ħlillu, ħlili)*
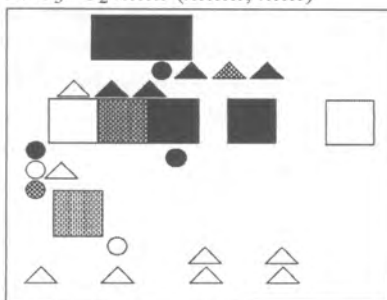
4. $C_3=C_2$ *nqiqi, ṭriri*, etc.
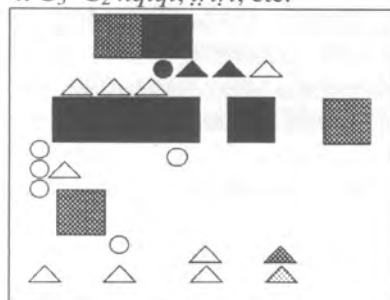
5. $C_4=C_2$ *ħliw(w)l, ħliw(w)əl*
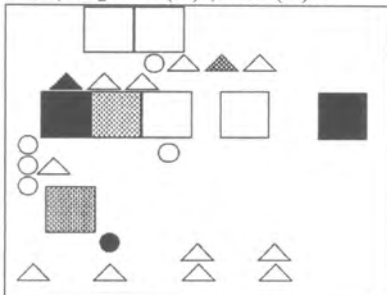
6. $C_4=C_2$ *nqiwq, nqiyq, ṭriwṛ, ṭriyṛ*
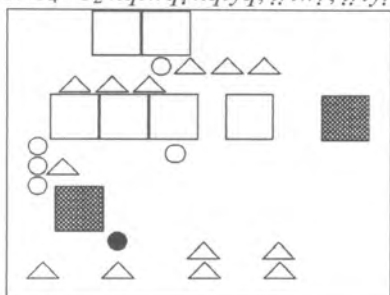
Maps 7-18: Nominal diminutives

7. *dliwi < dlu* (excluding *dălw*)
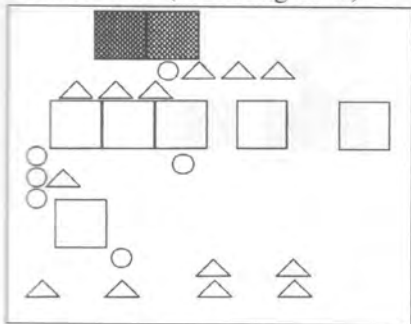
8. *žRiwi < žRu* (excluding *žărw*)
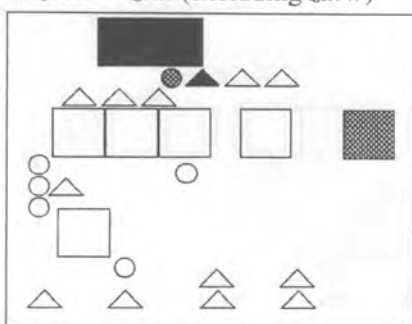
9. *ždiwi < ždi*
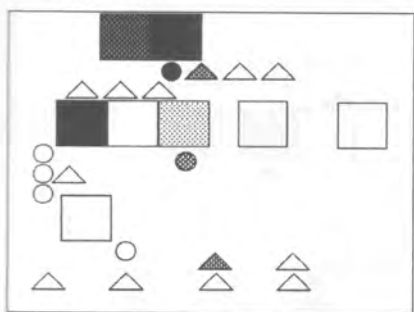
10. *dliw, dliww, dliwu*
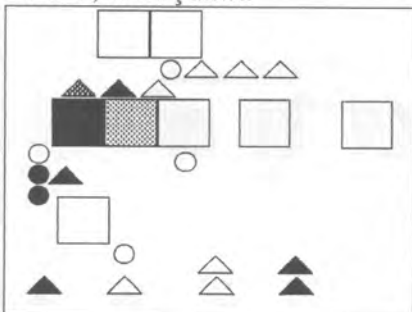
11. *žriw(w), žriwu < žRu*
    (excluding *žărw*)
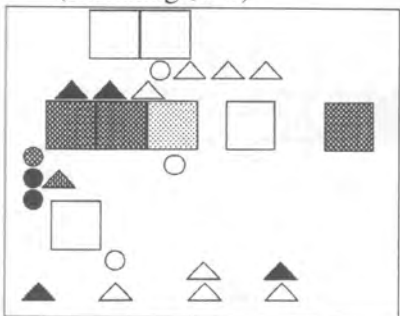
12. *ždiw(w)*
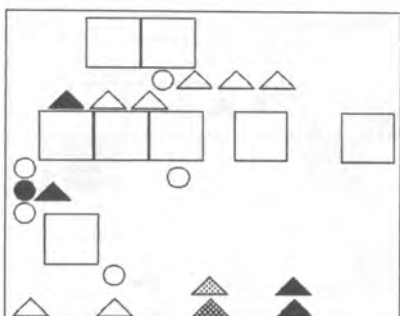
13. *ždey, ždiyi*
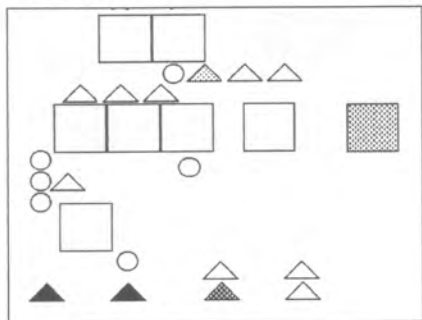
14. $C_3=C_2$ *dlilu < dlu* (excluding *dălw*)
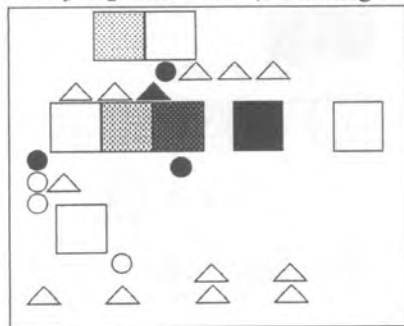
15. $C_3=C_2$ *žRiRu*
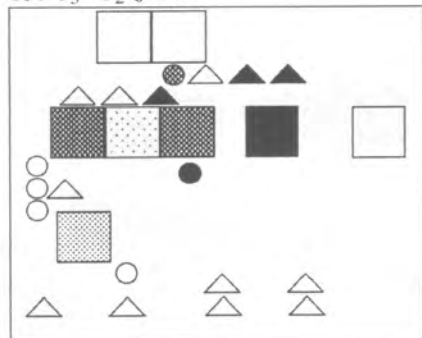
16. $C_3=C_2$ *ždidu, ždidi*
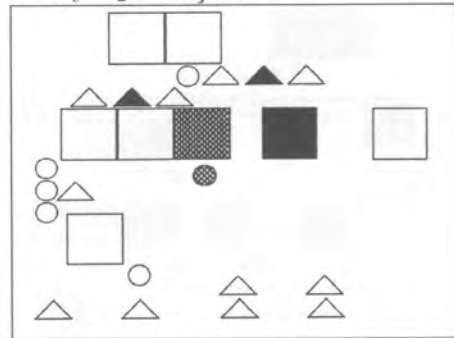
17. $C_4=C_2$ *dliwl, dliyl< dlu*
(excluding *dălw*)
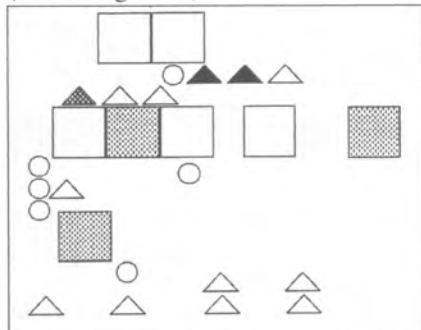
18. $C_4=C_2$ *ždiwd, ždiyd*
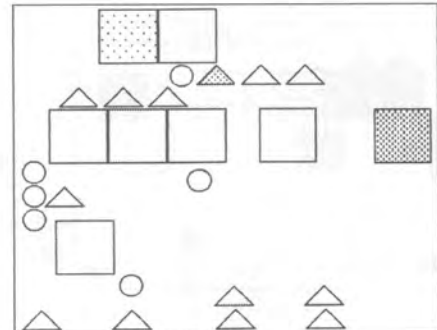
Maps 19-28: Nominal Plurals

19. *dli, dla*
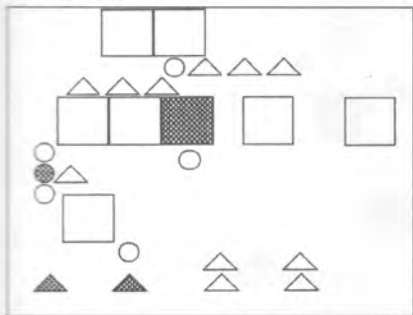
20. *žRa*
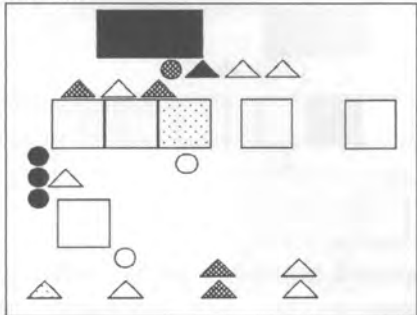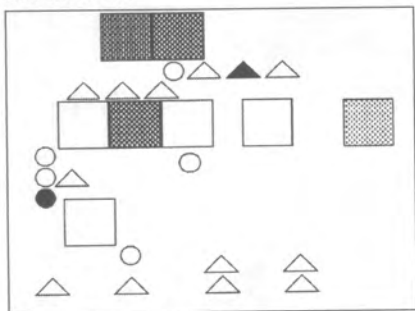

21. *dlaw*
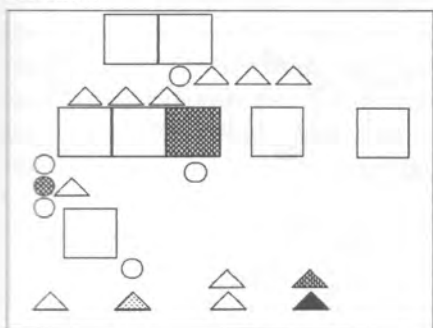
22. *žRaw*
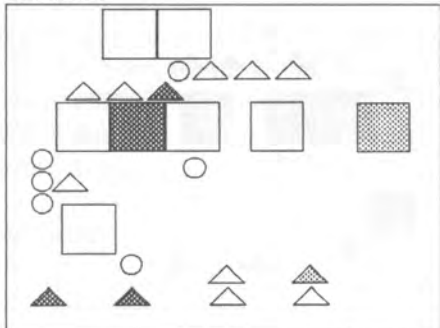
23. *dlawi, dlawa*
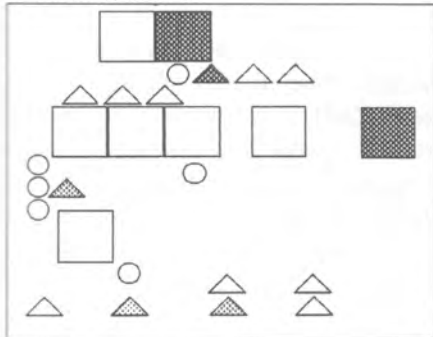
24. *žRawi, žRawa*
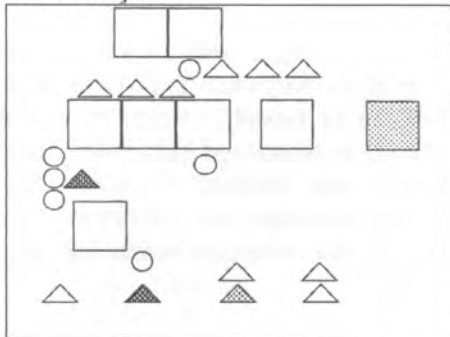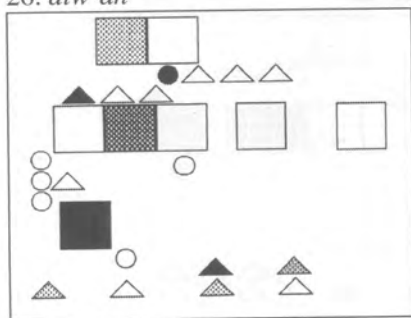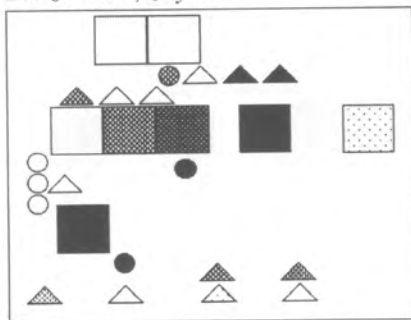
25. *dlaw-at*

26. *dlw-an*

27. *žRw-an, žRy-an*

28. *dlula, dluwa*