Initial vowel syncope and reduction in Tamazight-Berber nouns

Jilali Saib

How to cite this article: Saib, Jilali (1982). Initial vowel syncope and reduction in Tamazight-Berber nouns. Langues et Littératures, 2, 159-184.
INITIAL VOWEL SYNCOPE AND REDUCTION IN TAMAZIGHT-BERBER NOUNS

Jilali SAIB
Faculty of Letters – RABAT

0. Introduction:

This paper investigates a particularly puzzling problem in Berber grammar – that posed by the inconsistent behavior displayed by nouns when they appear in «construct state» (CS) environments. The term «construct state», which is defined more precisely in Section 1 below, refers to the shape of the noun when it is the subject, or the complement of a preposition (i.e. in the nominative or the oblique case). Specifically, the problem stems from the fact that the initial (or root vowel) of some nouns is affected by one of the processes operating in the CS, while others are not. The changes (ablaut, syncope, reduction) which affect the initial vowel of the nouns have long been observed (cf. Hanoteau 1885, Laoust 1918). However, an analysis providing a general explanation as to what nouns undergo what type of change, and why they do so, is still lacking.

In this paper, the traditional approaches to the problem are discussed, one – that of Basset and Picard – in some detail. An alternative analysis motivated by a search for phonological conditioning is offered.

1. The problem:

The process we are dealing with is exhibited by certain feminine nouns some of which lose their initial vowel, while others reduce it to schwa, when they are in the CS. But before we proceed, a word on what is meant by «construct state» and «free state» is in order.
A term borrowed from Semitists and Egyptologists, is used in Berber studies to refer to the varying shape in which a noun appears. Depending on their position in sentences and/or phrases, Berber nouns are in one of two states: the «free state» (French: «état libre»), hereafter FS, or the «construct state» (French: «état construit»). A noun is in the CS when it occurs in the following syntactic environments:

a) As the subject, postposed to the verb. (Recall, Berber is a Verb first language.)

b) As the complement of certain prepositions.

c) As the second of two conjoined but not disjoined NPs.

This is illustrated in (1).

1) a) [θ-eddaθ-mazi;θ] → [θ-eddaθ-mazi;θ] «she went, (the) Berber woman»

b) [neθ-mazi;θ] 

[Where [tt] results from the assimilation of δ + θ]

c) [amazi;ettmazi;θ] 

«the Berber woman»

The FS refers to the shape of the noun in the citation form, or when it appears in the following syntactic environments:

a) The accusative environment.

b) A topicalized NP.

c) After a «neutral» preposition such as γend «or», s «to», etc. These prepositions are so-called because they do not affect the nouns which they govern. (*)

(*) The present paper is the entire chap. 6 of my doctoral dissertation (Saib 1976), which, because of the deadline set by Langue et Litteratures, I am presenting here unchanged, except for the title which was simply: «Vowel Syncope and Reduction».

(1) With respect to the CS formation, the prepositions can thus be subdivided into two groups. Some of the prepositions after which the nouns are affected in the CS are: i «to», i «in», amm «like», s «with (instrumental)», zej «from», ddaw «under», etc. The preposition after which the nouns are affected in the CS are: s «to (directional)», γend «or», all «until», qbel «before», bla «without» and b3ed «after». The transcription used in this paper is, for the most part, that of the I.P.A. Some symbols have been substituted, however. They are:  č,  3, e, for I.P.A.  đ,  tʃ,  s ——. A dot underneath a C indicates Pharyngealization.
The change which the feminine nouns undergo when they occur in construct state environments is of two kinds: Initial Vowel Deletion (Syncope) and Initial Vowel Reduction (Vowel Reduction). The examples in (1) above all illustrate the process of Syncope. This process affects the nouns in the CS regardless of their number. As illustrated in (3) plural nouns also undergo the change:

(3)  **Free State (FS)**  
\[\# \theta-\text{amazi}^-\text{in} \# / \rightarrow \# \text{n} \# \theta-\text{amazi}^-\text{in} \# / \]
\[\theta\text{amazi}^-\text{in} \text{ « Berber women »} \rightarrow \text{n}\theta\text{amazi}^-\text{in} \text{ « of Berber women »} \]

\[\# \theta-\text{ixam-in} \# / \rightarrow \# \text{n} \# \theta-\text{ixam-in} \# / \]
\[\theta\text{ixam-in} \text{ « tents »} \rightarrow \text{n}\theta\text{ixam-in} \text{ « of the tents »} \]

The plural forms \( \theta\text{amazi}^-\text{in} \) and \( \theta\text{ixam-in} \) are derived from the singular \( \theta\text{amazi} \theta \) and \( \theta\text{axam} \theta \) (cf. (1) above) via the following changes—all of which represent but one means of plural formation in Berber:

(i) Affixation of the plural suffix -\text{in}, which replaces the singular suffix -\text{\theta}.

(ii) Initial vowel ablaut: sing. \text{a} \rightarrow \text{plur. i}.

Instead of exhibiting initial vowel syncope in the CS, some feminine nouns show initial vowel reduction. This is illustrated in (4), where the reduced vowel, phonetically a schwa, is represented in this study by \( \text{e} \).

(4)  **FS**  
\[\# \theta-\text{arwa} \# / \rightarrow \# \text{n} \# \theta-\text{arwa} \# / \]
\[\theta\text{arwa} \text{ « canal »} \rightarrow \text{n}\theta\text{erwa} \text{ « of the canal »} \]

\[\# \theta-\text{islit-t} \# / \rightarrow \# \text{n} \# \text{islit-t} \# / \]
\[\theta\text{islit-t} \text{ « bride »} \rightarrow \text{n}\theta\text{eslit-t} \text{ « of the bride »} \]

This process also affects plural nouns, hence \( \theta\text{isla\theta-in} \) « brides » appears an \( \theta\text{esla\theta-in} \) in the CS.

The two processes cannot be interchangeable, as seen in (5).
By way of anticipation, the reason for the non-occurrence of the forms in (5) is as follows: the process of Initial Vowel Syncope affects only nouns with an open syllable, while that of Vowel Reduction operates only on nouns with a closed syllable— a fact not mentioned in previous studies. In Berber, a syllable is closed when its consonantal coda consists of a cluster of unlike consonants or a geminate cluster. As will be clear in (8) below, only initial vowels followed by a cluster of unlike consonants are affected. For ease of exposition, we leave unanswered at this point the question of whether the surface forms in (4) result from the application of Vowel Reduction alone or from the application of both Syncope and then Epenthesis. We return to this matter below.

Not all Berber feminine nouns are affected in the CS by the changes illustrated above. Certain nouns do not undergo either change. Neither their morphology nor their meaning provide us with a way of distinguishing them from those in (1), (3) and (4). Among these non-affected nouns are all those in which the first vowel is u. As seen in (6), nouns with an open initial syllable, which would normally undergo Syncope, do not delete their first root vowel when it is round.

Nouns such as those in (6) — though limited in number — are not affected in the CS. In (7) below, nouns with u as the first root vowel and a closed initial syllable are not affected, as one might expect, by Vowel Reduction.
Another group of nouns which, likewise, are not affected in the CS are nouns whose initial syllable is closed with a cluster of identical consonants (i.e. geminates). Contrary to one’s expectation they are not subject to Vowel Reduction, as seen in (8):

(8) FS
/#[θ]-aqqay-θ#/ / [θaqqayθ] «small button»
[θaqqayθ] «of the small button»
* [enθeqqayθ]

CS
/#[θ]-addar-θ#/ / [θaddarθ] «house»
[θaddarθ] «of the house»
* [enθeddarθ]

Still another group of feminine nouns not undergoing the changes in the CS is that exemplified in (9) and (10). In these, however, the initial syllable is like that of nouns in (1), (3) and (4), which are affected by the two processes under investigation.

(9) FS
/#[θ]-aδaw-θ#/ / [θaδawθ] «back»
[θaδawθ] «of the back»
* [enθaδawθ]

CS
/#[θ]-isen-θ#/ / [θisenθ] «salt»
[θisenθ] «of the salt»
* [enθisenθ]

(10) FS
/#[θ]-arsel-θ#/ / [θarselθ] «pillar»
[θarselθ] «of the pillar»
* [enθerselθ]

FS
/#[θ]-alxaδemθ#/ / [θalxaδemθ] «ring»
[θalxaδemθ] «of the ring»
* [enθelxaδemθ]

CS
/#[θ]-arsel-θ#/ / [θarselθ] «of the pillar»
[θarselθ] «of the pillar»
* [enθerselθ]

The non-occurrence of * [enθaδawθ] and * [enθisenθ] in (9) attests to the fact that Syncope is inoperative in this case. Similarly, the data in (10)
clearly indicate that certain nouns are not subject to Vowel Reduction in the CS.

In summary, the situation in the CS for the feminine nouns is as given in (11):

(11) a) Some nouns with an open initial syllable delete their first root vowel if it is non-round. (cf. (1), (3))

b) Some nouns, the first syllable of which is closed by a cluster of unlike consonants, reduce their initial non-round vowel. (cf. (4))

c) All nouns with an initial round vowel or with a first syllable closed by a geminate cluster undergo neither of the aforementioned processes in the CS. (cf. (7) and (8))

d) Some nouns whose initial syllable is identical with that of nouns affected by the changes do not undergo the expected changes. (cf. (9), (10)).

Finally, while a statistical count will indicate that the nouns described in (1ld) are limited in number when compared to those in (11 a, b), the situation summarized in (11) still raises a number of questions. First, and assuming that we do not simply mark the nouns in (1ld) as exceptions to the rules, how should they be distinguished from the nouns in (11b)? Second, why do the nouns referred to in (11a, b) undergo the changes and those in (11d) do not?

In sections 2 and 3, two traditional approaches are discussed: a purely "taxonomic" approach represented by Laoust’s study of the Ntifa dialect (1918), spoken near Demnate, and the more "descriptive" approach of Basset and Picard (1947). In section 4, Basset and Picard’s approach is "translated" into the generative framework and critically evaluated. An alternative approach based on syllable structure analysis is offered in its stead in section 5, below.

2. The traditional approach.

Regarding the various changes exhibited by the nouns in the CS, previous studies on Berber dialects do not go beyond a "level of observational adequacy". Some authors, for example Hanoteau (1885), do not even reach this level of analysis as they are limited to stating how certain French or Latin constructions (in this case mostly that of the genitive) are rendered in Berber.

By far the most commonly held approach to the problems raised by the CS formation is what is termed — following Chomsky (1964) — a "taxonomic" approach (cf. Laoust 1918, and Foucauld 1920 for some good examples). This approach consists of providing a list of the changes (cf.
(1), (3), and (4) above), a few illustrating examples and a few remarks. Little or no discussion — let alone explanation — as to what governs the changes (i.e. conditioning), or why some nouns are affected while others are not, is to be found in these studies. That this should be the case is surprising since the relevant data was made available at least for some dialects — the Twareg dialects. In his pioneering work on Twareg-Tahaggart, Foucauld, to whom we owe the first and only extensive dictionary on Berber, had the brilliant idea of indicating with the symbol $\phi$ the nouns which are affected in the CS; (cf. Dictionnaire Touareg-français, published posthumously (1951)). Yet studies on Twareg (Cortade 1969, and Prasse 1973) contain no in depth analysis of the problem. Cortade devotes only two pages (p. 25 and p. 118) to the CS formation. In an otherwise fairly extensive treatment of the nouns in Twareg from a historical perspective, Prasse (1974 : 11) simply refers the reader to previous analyses (Basset 1945, Galand 1963). For in the words of Prasse, « Le comportement de l’initiale des noms est le seul problème de la morphologie nominale qui ait été traité, jusqu’ici, de façon satisfaisante.» (My emphasis, J.S.). Basset’s analysis — included in Basset and Picard (1948) — is discussed below. It, incidentally, would not be totally adequate for Twareg as this latter lect exhibits a richer variety of ways of forming the CS, two of which (vowel ablaut and vowel reduction) are not considered by Basset.

The distinct impression one gets from reading previous works in Berber on this process is that no generalization can be arrived at. Statements like the following «la pratique seule fait connaître les noms qui, en rapport de dependance (i.e. CS), conservent leur a ou leur i initial » (Laoust 1918) : 102) are common. They suggest that only usage — and hence a great deal of memorization for both language learners and Berber speakers — will indicate which nouns conserve their vowel and which do not. Laoust’s statement clearly does not suggest the possibility of there being some phonological conditioning factor(s) for either of the aforementioned processes (i.e. Syncope and/or Initial Vowel Reduction).

Several reasons why Laoust and other Berberists may have reached this conclusion are possible. They are: (i) The situation in present day Berber dialects is indeed very complex. (ii) On the surface, a great deal of variation and inconsistency is exhibited. Historical changes — in particular restructuring — may be responsible for this. (iii) Native speakers’ judgements often fluctuate, especially regarding CS environments other than the subject position, but also with respect to individual nouns.
3. The non-constant vowel analysis (NCVA).

A more «descriptive» approach to the problems raised by the CS formation is adopted by a few Berberists: Basset (1945), Basset and Picard (1948), de Vincennes and Dallet (1960), and Penchoen (1973). Since the last two accounts are but notational variants of that of Basset and Picard, only the latter is discussed here in some detail.

Basset and Picard attempt to provide a general treatment of the CS formation for Kabyle (Irjen). Noting the inconsistent behavior exhibited by the nouns in the CS, they set out to find a way of determining which initial vowels are affected and which are not. Both masculine and feminine nouns are considered, though the latter group is the one chosen by the authors to illustrate their hypothesis since, in their eyes, «les faits sont plus simples et plus clairs» (p. 33), in the CS of feminine nouns.

Basset and Picard's thesis is based on the nature of the initial vowel of the nouns. This vowel may be either «constant» («voyelle constante») or «non-constant» («voyelle non-constante»). Deletion which is the only process recognized by Basset and Picard — occurs only if the first root vowel is non-constant. According to the authors, the constancy of the initial root vowels in the nouns crucially depends on whether they do or do not alternate with i in the plural. As illustrated in (3) above, the alternation of initial non-round vowels with i in the plural is but one means involved in the regular plural formation. Since Basset and Picard's analysis claims that only non-constant initial vowels are affected in the CS, it will be referred to in the remainder of this paper as the «Non-Constant Vowel Analysis» (hereafter NCVA).

Basset and Picard's attack on the problem begins by establishing which initial vowels alternate and which do not in the plural of the nouns in Kabyle (Irjen). In this dialect, the initial non-round stem vowel of singular nouns normally alternates with i in the plural as seen in (12).

(12) Sing. Plur.
θayazitt θiyuzad «hen(s)»
θizimmerθ θizammarin «ewe(s)»
(Cf. Basset and Picard's group II, p. 34.).

It should be noted that with the exception of Twareg dialects which exhibit additional initial ablauts in the plural, the alternation sing. a/ : plur. i is pan-Berber. The other vowel alternations (au, ea, and ia) are secondary developments with no bearing on the present discussion.

Nouns undergoing the plural formation such as illustrated in (12) are said
to have an alternating initial vowel. It is the claim of Basset and Picard that, when the initial non-round vowel of the feminine nouns alternates with i in the plural, as in the case in (12), it is also non-constant. As such, it is syncopated in the CS, as seen in (13):

(13)     Sing.                           Plur.
       /#n#θayaziθ-θ#/                  /#n#θ-iyuzaθ#/       
       [neθyazitt] «of the hen»       [neθyuzaθ] «of the hens»     
       /#n#θ-izimmer-θ#/               /#n#θ-izammar-in#/     
       /#n#θ-izimmer-θ#/               /#n#θ-izammar-in#/     
       [nedzimmerθ] «of the ewe»      [nedzammarin] «of the ewes»

The authors are aware of the existence of cases where the initial stem vowel of singular feminine nouns is either non-alternating in the plural, or alternates with vowels other than i (i.e. u or a). This is exemplified in (14):

(14)     Sing.                           Plur.
       a)  θaggawθ                        θaggawin «niece(s)»
           θilefθ                          θilfuθin «sow(s)»
           θuššett                        θuššanin «jackal(s)»
       (Cf. Basset and Picard’s group I-A, p. 33)
       b)  θaddarθ                        θuddar «house(s)»
           θiššerθ                         θaššarin «asperity»
       (Cf. Basset and Picard’s group I-B p. 33)

In nouns such as those in (14 a) the initial vowel remains intact in both numbers, and is thus called «voyelle constante» (constant vowel) by the authors. In the forms in (14 b) the initial vowel enters into nonproductive and highly idiosyncratic alternations. It is considered alternating, as well as «constante» by Basset and Picard. No explanation is offered for considering a and i as constant in (14b). The only reason that we can see for such a consideration is that, though these vowels are alternating, they are not affected in the CS.

In nouns such as those exemplified in (14) (cf. also (6)-(8) above), Basset and Picard go on to say, no change is observed in the CS. There is no difference between the phonological shape of the FS and that of the CS.

Given the facts presented in (11)-(13), the conclusion drawn by the authors is that «il y a, dans le traitement de la voyelle initiale, une relation fondamentale de nombre (i.e. pluralization) et d’état (i.e. state), (my emphasis, J.S.), les cas, s’il s’en trouve, ou ce principe ne s’applique pas, ne peuvent être qu’accidentels» (p. 34). A «correlation» is thus established.
between two grammatical processes «pluralization» and «state», with the former providing a means of predicting the latter.

As for pronunciation problems caused by clusters that arise after the deletion of the initial vowel of feminine nouns, Basset and Picard make the following statement (p. 34):

In the CS, if the prefix θ and the first stem consonant form what they term «un groupe phonétiquement prononcé», they are permitted to follow one another without being separated by any vocalic segment (e.g. [θyazitt] «hen»). If, on the other hand, they form «un groupe imprononcé», the two consonants (i.e. θ + 1st stem consonant) are separated by a vocalic element, phonetically a schwa (e.g. [θeθbirθ] «dove»).

Basset and Picard do not go into details concerning the question of what constitutes a pronounceable cluster and what does not. However, from the examples they provide, viz. FS : θaθβιrθ CS: θeθβιrθ «dove», it would seem that what they have in mind are sequences resulting from the combination of the feminine prefix θ- and non-strident dentals. In the form for «dove», the sequence θ + θ would result in a geminate [tt] if an epenthetic vowel is not inserted between the two dental segments.

The authors end their discussion on the behavior of feminine nouns in the CS by a series of «practical» suggestions. These concern the possibility of predicting the CS from the FS and the FS from the CS, based on the initial vowel of the nouns in the singular and the plural. The authors’ often confusing statements are reproduced here in the form of tables given in (15) and (16). These tables are to be utilized in the following way, taking as an example the first case in (15):

In the FS singular, if the initial vowel of a noun is u, then the initial vowel in the CS is predictable since it is u. However, if the initial vowel is a or i, it is not possible to predict the vowel in the CS, since a and i can be either constant or non-constant; etc.

(15) Relative Predictability of CS from FS:

<table>
<thead>
<tr>
<th>Initial in FS</th>
<th>Vowel</th>
<th>Prediction in CS</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sing.</td>
<td>u</td>
<td>yes</td>
<td>Same vowel as in FS.</td>
</tr>
<tr>
<td></td>
<td>a</td>
<td>no</td>
<td>a and i can be constant</td>
</tr>
<tr>
<td></td>
<td>i</td>
<td>no</td>
<td>or non-constant.</td>
</tr>
</tbody>
</table>

168
The analysis of Basset and Picard (hereafter B and P) can be summed up as follows:

(17) (i) As far as plural formation is concerned, the initial root vowels in the nouns belong to one of two groups: [+ Alternating] (a, i) or [— Alternating] (a,i,u).

(ii) With regard to the CS formation, these vowels are subdivided into two groups: a group of constant vowels (a,i,u) ; and a group of non-constant ones (a,i).

(iii) Non-constant vowels are those which alternate with i in the plural formation.

(iv) Only those nouns with initial non-constant vowels are affected in the CS.

(v) Only one process (initial vowel syncope in our terminology) is said to be operative.


Assuming that B and P’s analysis is correct, the facts presented above would be handled within the generative framework by the addition of a
diacritic feature [+ Constant] (hereafter [+ C]) to the feature specification of the vowels. The vowels would then be classed as either [+ C] (viz. u. a. i) or as [– C] (viz. a, i). The evidence in favor of such a feature would be provided by the behavior of the initial vocalic segment in the plural formation. As stated above, the initial vowel of singular nouns may be alternating or non-alternating in the plural. Alternating initial vowels in the plural are non-constant in the CS.

With the addition of the specification [+ C] to the feature matrix of the vowels, the CS rule can be written so as to apply only to nouns with an initial non-constant vowel. Nouns with an initial vowel specified as [+ C] will be exempt. In this way the exceptional nouns are taken care of through exclusion by the CS rule, instead of being set aside as exceptions\(^3\). Note that if B and P's analysis is strictly adhered to, an additional diacritic feature, [+ Alternating] ([+ Alt]), would be required for the purpose of deriving the correct initial vowel of the nouns in the plural. Of the three vowels which appear as initial root vowels, u is consistently non-alternating, and a may be alternating or non-alternating in the plural. As for i its status with respect to this feature cannot be determined since the ablaut is one between a vowel and i (cf. the tables in (15) and (16)).

Given the above facts, the two rules claimed by B and P to be necessary for the CS formation are as formulated in (18) and (19).

(18) **Initial Vowel Ablaut**: (Plural Formation)

\[
\begin{array}{c}
V \\
[+ \text{Alt}] \\
\end{array} \rightarrow 
\begin{array}{c}
+ \text{high} \\
+ \text{Alt} \\
\end{array} / + 
\begin{array}{c}
+ \text{N} \\
+ \text{Fem} \\
+ \text{Pl} \\
\end{array}
\]

(2) The changes \( \theta + \theta \rightarrow [tt] \) and second forms respectively, are due to regular assimilation rules in Berber. We have taken the liberty to supply them. For some inexplicable reason. Basset and Picard give the following phonetic forms for «ewe»: [dzimmer\(\theta\)], and [dzammarin]. These forms are not accepted by Iqbayliyen who pronounce them with initial [dz-].

(3) [+ C] is of course an exception feature. According to Chomsky and Halle, it should be, by convention, spread to every segment in the morpheme (cf. SPE p. 175). But to specify all vowels in a stem with an alternating initial vowel as [+ C] makes little sense, since it is only the first vowel which is either deleted or retained. There are a few instances of alternating (i.e. non-constant) non-initial vowels in the plural (e.g. [dzimmer\(\theta\) «ewe»: dzammarin «ewes»]), but these are completely unsystematic and represent the exception rather than the norm. Thus, the application of Chomsky and Halle's convention merely complicates matters.
(An alternating vowel (a,i) ablauts into a high and alternating vowel (i), initially in the plural of feminine nouns).

(19) Syncope : (CS Formation)

\[
\begin{bmatrix}
V \\
+ \text{Alt.} \\
- C
\end{bmatrix} \rightarrow \emptyset / + \quad [+ \text{Fem} \\
+ \text{PI} \\
+ \text{CS}]
\]

(An alternating and non-constant vowel (a,i) is deleted initially in the CS of feminine nouns.)

The repetition of the feature [+ Alt] in the structural change (SC) of rule (18) is necessitated by the fact that the CS rule applies also to plural nouns. The only way to tell that a vowel is non-constant is if it is specified as [+ Alt]. By repeating the feature [+ Alt] to the right of the arrow, we ensure that the initial vowel of the plural is also subject to the CS rule. However, a readjustment rule converting the feature [+ Alt] into [— C] would also be required before (19) can apply.

Note that the requirement of such a rule points to a deficiency in the analysis: that of not having rules (18) and (19) in a direct feeding relationship. To alleviate this problem, a departure from B and P's assumptions is necessary. A way out would be to reject B and P's proposal that the diacritic feature [+ Alt] be used as the trigger for the plural rule. Since alternating vowels are also non-constant, a more economical way of formulating the plural rule would be to use only one diacritic feature, namely [+ C]. Rule (18) can then be reformulated as shown in (18').

(18') \[
\begin{bmatrix}
V \\
- C
\end{bmatrix} \rightarrow \begin{bmatrix}
+ \text{high} \\
- C
\end{bmatrix} / + \quad [+ \text{N} \\
+ \text{Fem} \\
+ \text{PI} \\
- \text{CS}]
\]

As seen in (18'), two adjustments are made: the repetition of [— C] in the SC of the rule and the addition of the specification [— CS] to its SD. Their justification is as follows: the carry over of the feature [— C] to the SC of the rule is needed to ensure that the initial vowel of the plural nouns be also subject to rule (19). The specification [— CS] is needed to block the application of (19). Since the input segments are now specified as [— C], they can also be operated on by rule (19). The application of this rule would have the effect of « bleeding » the input for the plural rule. As indicated in the table given in (16) above, the initial vowel of the nouns in the FS in not always recoverable from the CS forms.
The other ways of ensuring the applicational precedence of the plural rule (18) over that of the CS are: (i) by imposing an order on their application, (ii) by marking all the nouns subject to the CS rule with an exception feature such as [– Rule 19], (iii) by letting the CS rule go «global» (cf. Kisseberth 1969). The need for a «global» CS rule in Berber is revealed by the fact that, if the output segment of the plural rule is not marked for constancy, the CS rule would be applicable to it only if it had access to its derivational history. As stated above, only those initial i's in the plural nouns which are derived via initial vowel ablaut, are subject to the CS rule.

Given the assumptions of the standard theory, the most adequate way to remedy the deficiencies of B and P's analysis would be to reformulate the plural rule as in (18'), and to impose an order on the application of the two rules involved.

Other alternative solutions could be posited within the generative framework such as:

1) The use of phonological features as diacritics, e.g. to distinguish between two a's and two i's. Those which alternate could be represented as /æ/ and /e/ respectively — that is [– high, -back]. Those which do not (/a/ and /i/), would be specified as [+ back]. The rules would be formulated to apply to the specified phonological features; and absolute neutralization rules would be needed to derive the correct phonetic segments. The arguments against such an approach are strong enough not to give it any serious consideration.

2) The rule exception feature of the type [– Rule X]. Under this solution, nouns with a non-alternating initial vowel in the plural, and nouns which do not undergo syncope in the CS, would be so marked in the lexicon.

Summary and critique: To summarize, the generative interpretation of B and P and the alternatives outlined above can handle the problem posed by the inconsistent behavior of the initial vowel of the feminine nouns in the CS. However they do so only through the use of a number of formal devices which, for ease of reference, are listed in (20).

(20)  
(a) The use of diacritic features  
(b) The diacritic use of phonological features  
(c) Rules of absolute neutralization.

(4) The concept of «global rules», first introduced for phonology by Kisseberth (1970), is still the object of much debate. See Kiparsky (1973), Dinnsen and King (1972), Dinnsen (1975) for some arguments against global rules, and Miller (1975) for arguments in their support. Nevertheless, the Berber data appear to support Kisseberth's contention that global rules, i.e. rules which require access to the derivational history of segments (or forms), be incorporated into the theory.
It may indeed be necessary that a theory of phonology incorporate such devices to account for exceptions. There is at present no accepted hypothesis regarding how exceptions should be handled, although there is discussion on exceptions in SPE and in Kisseberth (1970) and Schane (1973).

A more important problem regarding B and P's solution is that, as will be shown, their proposal is descriptively adequate only up to a point. B and P base their analysis on the fact that the constant initial vowel of the nouns does not alternate in the plural. However, a close look at the Tamazight data will show that this criterion fails in many cases.

Specifically, some feminine nouns with an alternating (hence non-constant) initial vowel in the plural do not undergo the changes in the CS. This is illustrated in (21) where it can be seen that neither syncope (21a), nor vowel reduction (21b), apply.

(21)  
<table>
<thead>
<tr>
<th>CS (sing.)</th>
<th>CS (plur.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) /n#θasa#/ * [neθsa], * [netsa]</td>
<td>/n#θ-isatt-in#/ * [neθsattin], * [netsatting]</td>
</tr>
<tr>
<td>[enθasa] «of the liver»</td>
<td>[enθisattin] «of the livers»</td>
</tr>
<tr>
<td>b) /n#θajjal#/ * [neθjjal], * [enθejjal]</td>
<td>/n#θ-ijjal#/ * [neθijjal], * [enθejjal]</td>
</tr>
<tr>
<td>[enθajjal] «of the widow»</td>
<td>[enθijjal] «of the widows»</td>
</tr>
</tbody>
</table>

Another set of data which B and P's analysis fails to handle is afforded by a group of syncopating feminine nouns with no plurals. As seen in (22) the initial vowel of these nouns undergoes syncope in the CS.

(22)  
<table>
<thead>
<tr>
<th>FS</th>
<th>CS</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) /#θ-αβaya#/</td>
<td>/#n#θαβaya#/ _</td>
</tr>
<tr>
<td>[θαβaya] «tobacco»</td>
<td>[enθbaya] «of the tobacco»</td>
</tr>
<tr>
<td></td>
<td>* [enθaβaya]</td>
</tr>
<tr>
<td>b) /#θ-αçessa#/</td>
<td>/#n#θ-αçessa#/</td>
</tr>
<tr>
<td></td>
<td>* [enθaçessa]</td>
</tr>
</tbody>
</table>

Nouns such as the one in (22 b) belong to the class of deverbal nouns. While B and P recognize the problem posed by these Nouns to their analysis, their proposed remedy consists of positing yet another correlation. Whether the initial vowel of deverbal nouns is constant or nonconstant depends on whether or not the related verbs exhibit vowel and/or consonantal alternations in their conjugation (p. 36). Clearly, this is still another complicated way to predict initial vowel constancy which only an analyst would utilize.
But the most problematic case for B and P's analysis is with respect to determining the constancy of the initial vowel of the nouns which begin with i (e.g. ØizimmerØ «ewe» etc.). Here the authors' criterion fails completely. This is indicated in the tables given in (15) and (16) above. Since the initial vowel ablaut in the plural is one between a non-round vowel (a, i) and i, given a noun with an initial i, one has no way of determining — save arbitrary marking — whether the initial i of the singular is alternating or not. Consequently, the constancy of the initial vowel of these nouns cannot be determined by what is taking place in the plural. This serious problem is recognized by B and P. However their solution for it — i.e. the postulation of two distinct «series» of i's, one constant and the other non constant — is clearly arbitrary. Moreover, it points to a serious deficiency in their analysis — its circularity.

B and P's handling of nouns with initial i's is arbitrary because there is no independent justification for postulating two series of i's. Nor is there any justification for their claim (p. 35) that, «confusion aside» (sic : my translation), there is no connection between the i of the singular and that of the plural. B and P's solution for the problem posed by nouns with initial i's is also circular since the only time we have an indication as to the constancy (or non-constancy) of initial i's is precisely in the CS formation, which the authors sought to predict.

In addition to these arguments based on empirical evidence, a number of objections based on theoretical considerations can be made against B and P's NCVA and its variants. First, in order for these analyses to account for the data, an extensive use of one or more of the devices listed in (20) is resorted to. While, due to phonological leveling and other historical processes, some sort of marking is necessary, the requirement of the marking devices (20 a and b) makes these analyses very costly. As such, they should rank very low on the evaluation scale. This is so because — apart from using exception features — the only reason for requiring rules of absolute neutralization is to fix things up in the derivation so that the correct output would be obtained. Clearly, this is ad hoc and hence objectionable on principled grounds.

Second, B and P's analysis, if considered viable, not only implies that native speakers make a connection between the behavior of the initial vowel in the plural and its constancy in the CS, but also that a great deal of memorization is involved in their mastery of the CS formation. It also implies that the behavior of the initial vowel of the feminine in the CS is not phonologically conditioned. In other words, the phonological shape of the nouns is of no consequence.
The first implication is highly suspect since only an analyst would normally make a connection between the behavior of the initial vowel in the plural and its constancy in the CS. As for the second and third implications of B and P's analysis, it remains to be seen whether other means, e.g. phonological conditioning, are not utilized by Berber speakers. In the following section, the possibility that the behavior of the nouns in the CS depends on their phonological make-up is explored.

5. **The Syllable Structure Analysis (SSA)**

The analysis to be presented owes its name to the fact that it is based on the syllable structure of the nouns — especially the shape of the initial syllable. It is motivated by a search for phonological conditioning for the changes which occur in the CS.

5.1. **The proposal.**

The proposal embodied in the syllable structure analysis is that the initial vowel of the nouns undergoes the changes in the CS (i.e. Syncope or Vowel Reduction) if: (a) it occurs in an open syllable (i.e. it deletes), (b) it occurs in a syllable closed by a cluster of unlike consonants (i.e. it reduces), (c) the feminine form is derived from a masculine form.

Thus, a relationship between the ability of a feminine noun to undergo the changes in the CS and its derivability from the masculine is posited, rather than one between singular/plural alternations as suggested by B and P.

Two rules are necessary to account for these facts, rules which do not depend on an arbitrary \[ + \text{Constant} \] diacritic feature. One rule, formulated in (23), states that the non-round vowel of derived feminine nouns is deleted initially in the CS if the syllable containing it is open.

(23) **Initial Vowel Syncope** :

\[
\begin{array}{c}
\begin{array}{c}
+ \text{voc} \\
- \text{rnd}
\end{array}
\end{array}
\rightarrow \ 
\emptyset / + \begin{array}{c}
\begin{array}{c}
+ \text{N} \\
+ \text{Fem} \\
+ \text{Der} \\
+ \text{CS}
\end{array}
\end{array}
\]

This rule accounts for the great majority of the syncopating feminine nouns examples of which are given in (1) and (3) above. The second rule needed within SSA is given in (24). It states that the non-round vowel of derived feminine nouns is reduced initially in the CS if the syllable containing it is closed by a cluster of unlike consonants.
Rule (24) handles nouns such as those given in (4) above, which are mainly disyllabic. Native polysyllabic (i.e. three or more syllables) singular feminine nouns with a closed initial syllable are limited in number in the lexicons used for this investigation. Another fact about polysyllabic nouns not shared by disyllabic ones is that only a few of them are not affected by the changes. That is, the number of exceptional cases is higher among disyllabic nouns. What this seems to suggest is the existence of a correlation between the number of syllables contained in the singular nouns and their amenability to undergo the changes. This is evidenced by the fact that, while most disyllabic singular nouns are affected by the changes in the CS, monosyllabic nouns are not affected at all. This is illustrated in (25), where only examples of monosyllabic nouns are given. (For some examples of disyllabic nouns which undergo the changes, see (4) above.)

(25)  

A possible explanation for this state of affairs is that the loss of the initial vowel (or its reduction) is not as crucial for polysyllabic nouns as it is for monosyllabic and disyllabic ones. In these latter nouns, the initial clustering which would result (viz. $\#\theta + CC$), would be in violation of the sequential constraints of Berber (cf. Saïb 1976, chaptles 2, Seq. Sc. 1). It may be possible that stress is involved in some way. This has been suggested by Prasse (1973, vol. 1). However, he does not provide any analysis along these lines. Prasse’s suggestion, though it is very tempting, is not followed in this investigation. In absence of a comprehensive study on stress in Berber — which is a non-distinctive feature in the language — it is not clear how reliable an analysis of the CS formation based on it would be.

In addition to rules (23) and (24), a rule for the initial vowel ablaut which takes place in the plural formation, would also be required within SSA. This rule would be as given in (26).
It should be pointed out that, in contrast with the analyses cotlined and discussed above (Section 4), no absolute neutralization rules are needed. Nor is there a need to posit, as B and P are forced to do, two distinct i’s. Due to the « messiness » of the synchronic situation, some exceptions to SSA do exist, e.g. θamettutt « woman », θaçessa « action of tending livestock ». However, these exceptions point to one direction: a small number of non-derived feminine nouns — mainly polysyllabic — are affected by the changes in the CS. All in all, however, the syllable structure analysis is basically sound. In what follows, evidence in support of it is presented.

5.2. The evidence for SSA:

Evidence that it is the openness of the initial syllable which provides an environment for syncope is indirectly afforded by non-syncopating nouns exemplified in (4) above. This is illustrated in (27), where the vowel in the non-open initial syllable does not delete.

(27) a) /#n#θ-alγem-θ#/ « of the camel (f) »
   * [neθlγemθ], [enθelγemθ]
 /#n#θ-arbaθ-θ#/ « of the girl »
   * [neθrbatt], [enθrbatt]

b) /#n#θ-aqqay-θ/ « of the button »
   * [neθaqqayθ], *[enθeqqayθ], [enθaqqayθ]

The initial vowel is reduced in (27 a) and remains intact in (27 b). To ascribe the feature [ + C] to the initial vowel in forms such as the one in (27b), as B and P would do, on the basis that it does not alternate in the plural, still does not explain why this vowel is constant in the plural.

Further evidence in favor of positing the syncope rule (23) is afforded by the plural formation of some nouns. Due to vowel deletion and vowel insertion processes brought about by the addition of some plural suffixes, these nouns wind up with an open initial syllable. As such, they become subject to syncope of the initial vowel in the CS. This is illustrated in (28).

(28) a) FS (sing.) FS (plur.)
    [θalyemθ]    [θileγmin] « camel(s) »
    [θiyremθ]    [θiyeγmin] « hamlet(s) »
    [θaddarθ]    [θiyεδrin] « house(s) »
(I am assuming that, in the CS plural, the rules apply to the output of the plural formation.)

The changes which take place in the plural formation also provide evidence for the second rule (Vowel Reduction) needed in the SSA solution. This is illustrated in (29). Note that the underlined vowels in the FS singular are deleted in the FS plural. This deletion which is caused by the addition of the suffixes -awin and -in creates an impermissible cluster, thereby providing an input to the schwa insertion rule(s) (cf. Saib 1976 [1974]).

(29) a) FS (sing.) FS (plur.)
[θixfawin] [θimselmin] «small head(s)»
[θameslemθ] [θameslemθ] «moslem(s)»

b) CS (sing.) CS (plur.)
[enθexefθ] [enθexefθ] «of the small head(s)»
[enθemeslemθ] [enθemeslemθ] «of the moslem(s)»

As can be inferred from the data in (28) and (29), the evidence presented in support of the SSA solution involves deletion and/or insertion of a vowel — mainly schwa — which occur in the plural. The SSA solution, thus, depends on the analysis which includes some or all schwas in underlying forms (cf. Saib 1976). Moreover, the SSA solution works on the premise that the initial schwa exhibited by some nouns in the CS results from vowel reduction rather than from an insertion by epenthesis rules applied to the output of a non-phonologically conditioned syncope rule. Below, we present another solution based on the distinction [+ derived], but in which all the schwas are inserted by epenthesis.

Given that the occurrence of schwas can be predicted in Northern Berber, the underlying forms for plural nouns such as bileymin «camels» need not have a schwa in the second syllable, viz. /θîlîm-θîn/, before the syncope rule applies. This rule, which would be stated without reference to the openness of the initial syllable, can apply yielding the intermediate form θ-lym-θ-in. At this stage the plural formation rule which deletes the feminine suffix /-θ/, and the rule of schwa insertion, viz. ∅ → e /C — CCV, would apply in the order given to yield the correct output in the CS : [θleymin].

Similarly, plural nouns such as bixfawin «small heads» need not appear with a schwa in their underlying representation. The underlying form for
θixfawin can be /θ-ixf-θ-awin/ instead of /θ-ixef-θ-awin/. Given /θ-ixf-θ-awin/, a syncope rule not sensitive to the shape of the initial syllable, i.e. a different rule from (23), can apply yielding the intermediate form θ-xf-θ-awin. This latter form would be operated on by the plural formation rule, and the aforementioned epenthesis rule would insert a schwa in its appropriate place yielding the correct surface form [θexfawin]. In the case of /θimslm-θ-in/ «moslems», a right-to-left iterative application of the schwa insertion rule (cf. Saïb 1976 [1974]) would be necessary.

Notice that this alternative, which for ease of reference I will call «the derived noun analysis» (DNA), is yet another notational variant of B and P's analysis. Both analyses assume that (1) only one process, initial vowel syncope takes place in the CS, and (2) this process is not phonologically conditioned. Like B and P's analysis, DNA implies that the way native speakers know which nouns are affected in the CS and which are not is through extensive memorization. Unlike B and P's analysis, however, DNA does not run into any trouble with respect to nouns with initial i. Nevertheless, the theoretical arguments advanced above against B and P's analysis (cf. Section 4) equally apply to the DNA solution. The argument in favor of DNA, that it is economical in that it exploits the persistent nature of needed epenthesis rule(s), is not enough — we believe — to make us prefer this analysis to a phonologically-motivated one if it can be worked out. So far, SSA appears to be a good candidate.

This conclusion is reached in spite of the fact that, because of the nature of the supporting data, the evidence for a process of initial vowel reduction in the CS is not a clear-cut one. The fact that the schwa exhibited initially by some nouns can also be predicted by one of the regular rules of epenthesis in Northern Berber may very well be a coincidence. The investigation of the CS formation in Southern Berber (i.e. Twareg) lends support to this statement. A look at data from Twareg (cf. Foucauld 1920, and Prasse 1974) reveals that initial vowel reduction is one of the processes involved in the CS. The other processes are : syncope, ablaut, and shortening.

That this is indeed the case can be seen in (30). Notice that the initial vowel is reduced even though it occurs in an open syllable.

(30)  

<table>
<thead>
<tr>
<th>FS</th>
<th>CS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>[tamiːdit]</td>
<td>[təmiːdit]</td>
<td>«female companion»</td>
</tr>
<tr>
<td>[tanuːbit]</td>
<td>[tənuːbit]</td>
<td>«young girl»</td>
</tr>
<tr>
<td>[tenirt]</td>
<td>[tənirt]</td>
<td>«antelope»</td>
</tr>
<tr>
<td>[temirit]</td>
<td>[təmirit]</td>
<td>«sweetheart»</td>
</tr>
<tr>
<td>[tibiay]</td>
<td>[təbiay]</td>
<td>«small goatskins»</td>
</tr>
</tbody>
</table>
To claim that the initial schwa of the CS forms in (30) results from the application of epenthesis to the output of vowel syncope would be incorrect. As in other Berber lects, consonant clusters do exist in Twareg and are subject to sequential constraints. However, no impermissible sequence would have resulted, had syncope applied. This is shown in (31):

(31)  
<table>
<thead>
<tr>
<th>FS</th>
<th>CS</th>
</tr>
</thead>
<tbody>
<tr>
<td>[tahaggart]</td>
<td>[thaggart] «noble; name of a tribe»</td>
</tr>
<tr>
<td>[tamahaq]</td>
<td>[tmahaq] «the Berber language»</td>
</tr>
<tr>
<td>[tididin]</td>
<td>[ddidin] «bad women»</td>
</tr>
<tr>
<td>[tina:riw:n]</td>
<td>[tna:riw:n] «plains»</td>
</tr>
</tbody>
</table>

Notice that the forms in (30) and those in (31) are of a similar phonological shape. Yet, no schwa is inserted between the feminine prefix t- and the first root consonant. The need for such an insertion, whose motivation is to break up impermissible clusters, does not arise in the case of the forms in (31). The inescapable conclusion, then, is that the schwa of the CS forms in (30) results from vowel reduction, not epenthesis.

Further support for the claim that initial vowel reduction is involved is afforded by the CS formation of masculine nouns. Contrary to what occurs in Northern Berber, the same CS processes apply to nouns in Twareg regardless of gender. A group of masculine nouns exhibit an initial schwa in the CS which cannot be shown to be derived via epenthesis. This is illustrated in (32).

(32)  
<table>
<thead>
<tr>
<th>FS</th>
<th>CS</th>
</tr>
</thead>
<tbody>
<tr>
<td>[amis]</td>
<td>[emis] «camel»</td>
</tr>
<tr>
<td>[ašok]</td>
<td>[ošok] «a kind of plant»</td>
</tr>
<tr>
<td>[emi]</td>
<td>[omi] «mouth»</td>
</tr>
<tr>
<td>[eγəf]</td>
<td>[oγəf] «head»</td>
</tr>
</tbody>
</table>

No consonant cluster, let alone an impermissible one, would have resulted in the forms if syncope had applied. Hence, there is absolutely no reason to suppose that the initial schwa of the CS forms in (32) results from epenthesis.

The above evidence from Twareg clearly indicates that a process of initial vowel reduction is involved in the CS. Given the relatedness of Twareg to Northern Berber, this evidence can be used, at least heuristically, to support the assumption that the process in question also operates in Northern
Berber. Now, what about the distinction [+ derived] which is assumed under the SSA solution? What evidence can be presented in its support?

The aforementioned distinction is posited because, on the basis of the data available to us, feminine nouns with no corresponding masculine are normally not affected by the changes in the CS. This is particularly true of disyllabic nouns. Nouns like $\theta$adaw$\theta$ « back », $\theta$arsel$\theta$ « pillar » (cf. (9) and (10) above), $\theta$afus$\theta$ « sun », $\theta$isen$\theta$ « salt » belong to the group of non-derived nouns. They also do not undergo the stated changes in the CS. A connection, thus, exists between the two facts. This helps explain why a number of nouns are not subject to either Syncope or Vowel Reduction.

That the first two nouns are not affected in the CS is particularly interesting since this cannot be explained by B and P's analysis. This is so because their initial vowel alternates in the plural, viz. $\theta$i$\delta$iwa « backs », $\theta$irsal « pillars », which makes it non-constant and hence subject to the changes in the CS. Since the initial vowel of nouns such as these remains unaffected, we have an important argument against B and P's criterion for predicting vowel constancy. Notice that this does not represent a problem for an analysis, such as SSA, which utilizes the distinction [+ derived].

The inadequacy of B and P's criterion for predicting the constancy of the initial vowel is further revealed by the investigation of the CS formation in Twareg. In Twareg the initial non-round vowel of a singular noun can be alternating in the plural and yet remain constant in the CS. This contradicts B and P's claim that, if a vowel alternates with i in the FS plural, it is non-constant and thus subject to the changes in the CS singular and plural. This is illustrated in (33).

The data are drawn from Prasse (1974, vol. 3, p. 20).

(33) a) FS (sing.) (FS) (plur.)
[ama:kras] [ima:krä:sa:n] « provider(s)
[taza:kayt] [tisak:ai:n] « young camel(s)

b) CS (sing.) CS (plur.)
[ama:kras] [ma:krä:sa:n]
* [ma:krä:sa:n]
* [ma:krä:sa:n]

6. Conclusion:

The purpose of this paper was to investigate a particularly vexing problem in Berber grammar — that posed by the inconsistent behavior displayed by nouns in the CS. The aim was twofold. First, it was to present as clearly as possible all the facts about the CS formation in Berber. Second,
it was to explore the possibility that the changes which affect the initial root vowel of the nouns in the CS may be phonologically conditioned. This possibility was denied by the previous approaches to this problem. The traditional approach assumed that only usage — hence memorization — can determine which nouns undergo the changes in the CS and which do not. Basset and Picard claimed to have found a solution to the problem. Whether a noun is affected or not depends on whether its initial vowel alternates in the plural. According to B and P, only those nouns with an alternating initial vowel undergo the changes.

Both approaches were shown to be inadequate on empirical and principled grounds (cf. Sections 4 and 5 above). Given our present knowledge of Berber, the syllable structure analysis, while not totally free of problems, seems to meet the criteria of descriptive adequacy better than do the traditional approaches. Until a more thorough investigation of the CS formation is undertaken, it is this latter analysis which appears to be more intuitively satisfying.

It is hoped that more work will be done on this particularly vexing problem in various Berber lects throughout the vast Berber domain, and that a comparison of the findings will be made. In this way, we may gain a fuller and better understanding of the process investigated here, an understanding which, we hope, will lead to a more descriptively adequate analysis.
References


Foucauld, Père de... (1920). «Notes pour servir à un essai de grammaire touarègue» Algiers : Carbonel.


