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A Grammar of Hdi

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Abbreviations

Abbreviations used in morpheme-by-morpheme glosses and in formulas:

1	First person
2	Second person
3	Third person
ABS	Absolutive extension
ADJ	Adjective
ADV	Adverb
AGAIN	Verbal extension coding repetition of the action
ALL	Allative
ALSO	Verbal extension coding the truth of the proposition compared to a previous propositions
APPL	Applicative
ASSC	Associative
AWAY	Extension coding movement away
BEN	Benefactive/dative
COLL	Collective
COM	Comment on the focus marker, particle *tá*
COMP	Complementizer
COMPL	Completive
COND	Conditional
CONJ	Conjunction
COP	Copula
DEF	Definite
DEM	Demonstrative
DOWN	Movement down extension
D:PVG	Distal extension: Point of view of goal
D:SO	Distal extension: Point of view of source
DU	Dual
Eng.	English
EP	Epenthetic
EXCL	Exclusive
FOR	Preposition coding benefactive/dative
Fr.	French
Ful.	Fula (Fulfulde)
FUT	Future
GEN	Genitive

GO	Goal orientation
Hau.	Hausa
HON	Honorific
HYP	Hypothetical
IMP	Imperative
IMPF	Imperfective
IN	Verbal extension indicating movement inside
INN	Extension coding movement to or from an inner space
INCEPT	Inceptive
INCL	Inclusive
INTERJ	Interjection
INV	Inverse
LOC	Locative
N	Noun
NEG	Negation
NOM	Nominalized
NORM	Normative
OBJ	Object marker
OUT	Verbal extension indicating movement from inside out
PART	Partitive
PAST	Past (Referential past tense)
PL	Plural
PO	Potential object extension *-ay*
POL	Polite form
PREP	Preposition
PROH	Prohibitive
PURP	Purpose
PVG	Point of view of goal
Q	Interrogative
QUANT	Quantifier
REF	Referential
REL	Relative
RESP	Respect
RHET	Rhetorical
S	Sentence
SEQ	Sequential marker
SG	Singular
SO	Point of view of source
STAT	Stative
SUBJ	Subjunctive

TENT	Tentative
UH	Unspecified human subject
UO	Unspecified object
UP	Verbal extension indicating movement upward
V	Verb
VN	Verbal noun

The following typographical conventions have been adopted: The Hdi and other foreign language material in the text is italic. Translations are in single quotation marks. Quoted speech within examples is in double quotation marks. The rare instances of emphasis in the text are marked by italics. Abbreviations in examples are in small capitals.

Chapter 1

Introduction

1. The name and the classification of the language

The language described in the present grammar is called by its speakers *gwád-á xdí* 'language of Hdi' or simply *xdí*. The language is variously reported in the literature as *Hide*, *hidé* (Eguchi 1971), *Xedi* (Newman 1990a), and *xədi* (Dieu and Renaud 1983). Hoffmann 1971 has it as Tur (Turu), i.e. under the English spelling of the name of the village where the language is spoken.

The language is spoken in Tourou and surrounding settlements in the Far North Province of Cameroon, on the border with Nigeria. Some speakers of Hdi have emigrated to Nigeria, specifically to Mubi and Yola, where the Hdi communities may number several thousand speakers. Our cursory observation of the speech of speakers of Hdi who have spent a long time outside of their community, whether in Nigeria or in Cameroon, indicates considerable changes in syntax. Simple clauses shift toward subject-verb-object order; complex sentences with verbs of saying very often have the clausal order matrix-embedded. Neither of these orders is characteristic of the Hdi spoken in Tourou, but they are found in many languages with which Hdi speakers come in contact.

The noun *xdí* is a Hdi place name for the administrative term *Tourou*. It is also the self-name of the language and the ethnonym. The evidence that it is a toponym is provided by the high tone on the locative preposition *dá* preceding it. Before nouns other than toponyms the preposition has low tone:

(1) *dzà'á* *dá* *xdí*
go PREP xdi:1SG
'I am going to Hdi'

Evidence that *xdí* is an ethnonym is provided by genitive constructions where it is a modifier:

(2) *xíɗákw-á* *xdí*
culture-GEN Hdi
'The culture of Hdi'

The evidence that *xdí* is also the name of a language is provided by its usage without the expression *gwáɗ-á* 'language of':

(3)

tà	*ghwá*	*tà*	*xgù-lú*	*kà*	*Kwindzílá*	*gà*
PREP	mountain	IMPF	call-UH	as	Kwindzila	in
xdí	*yá*					
Hdi	DEM					

'On the mountain called Kwindzila in Hdi'

Other Chadic languages have words that may be cognates of the word *xdi*, e.g. *hìdé* 'man' in Mina, Central Chadic. Given the fact that so many self-names around the world are based on the lexemes 'man, people', it is likely that a word meaning "man" was the source from which contemporary [xdi] derives.

The name *hidé* has been used in administrative documents in reference to the people who speak the language. We represent the language in the present work as Hdi, with the understanding that the initial *h* represents a velar voiceless fricative. This is the closest transcription of the pronunciation of the word and also matches its phonemic structure, consisting of an initial consonantal cluster followed by a high front vowel.

Eguchi 1971 gives the number of speakers, as per the 1962 census, as 5,963. Newman 1990a gives the number of speakers as 10,000 as of 1982. Hdi is used in local elementary schools only in the first grade, as is the norm with most indigenous languages in Cameroonian public schools.

Hdi belongs to the Mandara group of the Central (Biu-Mandara) Branch of Chadic (Newman 1990a, Dieu and Renaud 1983). Wolff (1981 and 1983) considers it to be a dialect of Lamang but does not support this claim with any argumentation. Dieu and Renaud (1983: 357) list it as a separate language belonging to the Western Branch of the Wandala (Mandara) subgroup. Eguchi (1971: 195) also considers Hdi to be an independent language, stating the lack of mutual intelligibility between Hdi and the surrounding languages, including the language of Ngosi (Lamang according to Wolff 1983) in Nigeria. Tests of mutual intelligibility between Hdi and Lamang conducted by SIL teams have demonstrated that there is no intelligibility between these languages (Stadler 1993).

According to oral history, the population of Hdi was established by Matsa and his son Gulu. Matsa was one of the twelve sons of Kɗeri. The other children of Kɗeri are said to have founded Kapsiki, Margi, Mabas, Gdalu or Gdolu, Xduvun, and other places. This oral history is interesting because the first three of these groups speak languages belonging to the same branch as Hdi, Central Chadic.

Fula (Fulfulde) and, to a lesser extent, Hausa are the second and third languages for many speakers of Hdi. Hdi maintain trade relations also with speakers of Kanuri (Nilo-Saharan), trading guinea corn for beans. Fula, Hausa, as well as Mafa, another Central Chadic language, are the principal sources of lexical borrowings into Hdi.

Data for the present grammar were gathered and rechecked in the field by Frajzyngier during the summer of 1991, spring of 1993, and summers of 1994, 1996, 1997, 1998, and 1999. The language assistants for this study were Romain Siloa Mbaka (born in 1970, completed first year of lycée in Mokolo); the late Patrice Douka Prafé (born in 1972, some education at the lycée at Mokolo); Roger Prafé (no relation to Patrice Douka Prafé; born in 1975, educated at the lycées in Mokolo and Maroua, speaking Hdi at home); Abel Ndjidda Kassie (born in 1970); Francis Barassoua Baigoua (born in 1971); Sikoa Sinowa (about 30 years old in 1996); and Benjamin Ngasnou (born in 1959). Benjamin Ngasnou spent six years teaching elementary school in Mokolo, four years teaching in Yagua, two years teaching in Tourou (Hdi), and twelve years teaching in Maroua. His wife is from Tourou, and at home they speak Fula and Hdi.

Erin Shay participated in the work on this grammar from 1992 to 1995. She then had to devote herself to another project, and Frajzyngier alone gathered additional texts, revised the grammar, and brought it to its present shape; he takes responsibility for all mistakes and errors.

We have been using two types of data: natural discourse data as occurring in narratives, conversations, and folktales; and elicited data. Examples from natural discourse data begin with a capital letter, regardless of whether they represent sentence initial fragment. The elicited data are used in as few structures as possible to illustrate complex morphological and morpho-phonological facts of the language and also to provide ungrammatical examples when necessary. Such examples begin with lower case letters.

Although the number of speakers of Hdi is small and the language is spoken in a relatively constrained area, there are nevertheless some dialectal differences. We did not have the opportunity to study the dialect situation in detail, but we would like to note the following observations. In the dialect closer to the center of the village the future marker is *dzà'á*, while in the slightly more remote area called *ndrúk*, it is *dà*. The first-person singular subject pronoun is *í* in the center, but *íyù* in the dialect of the more remote area.

The aim of this work is descriptive and explanatory. The description consists of hypotheses concerning the form of linguistic structures and hypotheses concerning the functions of linguistic structures. For both types of hypotheses we provide supporting argumentation and often evi-

dence. On the sound advice of Bernard Comrie, we refrained from drawing implications for past and current theoretical controversies in linguistics. We tried, however, space permitting, to explain various components of grammar through their relationship to other constructions or subsystems in the language.

The present study aims to be a reference grammar. Its scope includes phonetics, phonology, morphology, and syntax and the semantic functions coded by these means. The complex verb morphology and the rich system of syntactic construction constitute the bulk of the present work. The grammar is the first account of the grammatical system of this language. A number of phenomena it describes have not yet been described for any of the Chadic languages of the Mandara mountains, such as Lamang (Wolff 1983), Mandara (Mirt 1969/1970, Frajzyngier 1984), Mafa (Barreteau and le Bleis 1990), Mofu-Gudur (Barreteau 1988), and Ouldeme (de Colombel 1996). The grammar thus provides valuable material for a future comparative work in Chadic and Afroasiatic linguistics. For a general linguist it provides a source of information on unusual formal structures and the semantic functions they encode.

2. Typological characteristics of Hdi

2.1. Phonology

An interesting aspect of Hdi phonology is its syllable-structure conditions. The syllabic onset allows for much more variation than the syllabic coda. Clusters of two and three consonants are allowed in the syllabic onset, while no clusters of consonants (with one possible exception: see Chapter 2) are allowed in the syllabic coda. Moreover, in the syllabic coda (as opposed to simply the word-final position), all obstruents become voiceless, regardless of the voice characteristics of the consonants that follow them. Clusters of up to three rearticulated vowels are allowed. In phrase-internal position, vowels that do not have a grammatical function are deleted. When a vowel is deleted, its tone is also deleted. A vowel that replaces another in a sequence assumes the tone of the vowel it replaces; its own tone is deleted.

2.2. Morphology

The lexical categories of Hdi are nouns (including pronouns), verbs, a few inherent adjectives and adverbs, and interjections. The class of nouns

includes a set of independent pronouns that behave like full nouns. Most property concept words that have not been lexicalized as adjectives require genitive markers in modifying constructions. Most adverbs, and a few property concept words, are formed through reduplication of nouns or verbs.

The verbal predicate can include inflectional morphemes coding: the number of arguments; the semantic roles of the arguments; the spatial relations between the event and the place of speech; the direction of movement; the nature of the event (singular or plural); the plurality of the object; the point of view; and the referentiality of the event. Tonal changes code the distinction between dative and direct object pronouns.

A very salient feature of Hdi morphology, one that it shares with other languages of the Mandara group, is the existence of a rich system of verbal extensions that interact with inherent properties of verbs, with syntactic coding means, with arguments present in the clause, and with each other. Some verbal extensions have segmental structures identical with locative prepositions; others have non-locative sources.

The reduplication of lexical items is a morphological means whose functions differ depending on the lexical category being reduplicated. Reduplicated property concept words may form adverbs. Reduplication of numerals has a distributive function indicating that each of the individual members of the numeral is a participant in the event. The reduplication of verbs, alone or combined with other grammatical markers, is involved in the formation of aspects. Indirect object pronouns and verbal extensions are infixed between the reduplicated parts of the verb.

Nominal inflection is quite limited. The only inflectional markers we found on nouns are the sporadically used plural marker, a genitive marker that originated as a demonstrative and that is phonologically connected to a preceding noun, and certain tonal changes in genitive constructions.

2.3. Syntax

In pragmatically and semantically unmarked constructions, i.e. constructions that do not involve topicalization, focus, or role-changing markers, the language is head first and nominative-accusative. In many such constructions the predicate, whether nominal or verbal, precedes the subject and object, if any. When the predicate is verbal, the word order is verb-subject-preposition-object, i.e., the subject follows the verb and the object is marked by the preposition *tá*.

The following are some of the most salient characteristics of Hdi syntax: (1) There are two types of clauses, pragmatically independent and

pragmatically dependent, each having different formal properties. Pragmatically independent clauses are those that can be interpreted on their own, without any presuppositions. Pragmatically dependent clauses require specific presuppositions for their interpretation. The two types of clauses are distinguished by verbal forms, aspectual markers, and subject pronouns. Typically, pragmatically independent clauses are simple affirmative indicative clauses, and about truth (yes/no questions). Pragmatically dependent clauses are negative clauses, specific interrogative clauses ('wh'-questions), comments on focused elements, relative clauses, and a host of syntactically dependent clauses. (2) Hdi has two ways of coding the third-person singular subject, depending on the type of clause and on the aspect of the clause. (3) Subject pronouns are clitics that can be added to verbs or to complements. (4) There exist several means of coding pronominal objects, depending on the class of verbs involved and the aspect of the clause. (5) There is tight interdependency between morphological means of argument coding and configuration. (6) Clausal order is used for the coding of modality.

Three means are involved in the coding of grammatical relations: position with respect to the verb, extensions to the verb, and prepositions. The use of these means interplays with the coding of aspect and the pragmatic type of the clause. There is no one-to-one relationship between a given coding means and the grammatical role it codes. The grammatical role of a noun phrase is the result of interplay among the various coding means used in a given structure. Thus, the position after the verb—the most neutral coding device—may be occupied by the subject of a transitive or an intransitive verb. In focus constructions, the position before the verb may be occupied by either the subject or the object in focus. Which argument occupies which position is determined in part by the way the other arguments are coded and in part by the way in which aspect is coded. These facts argue for assuming the existence of several phrase-structure rules for various functional domains, such as the indicative clause, focus, and others.

Semantic relations between verbs and arguments are coded by a system of verbal extensions. Instead of postulating the existence of unitary semantic roles such as "agent" or "patient", our analysis points to a coding of a semantic relationship consisting of a cluster of features. There are two fundamental categories coded in the grammatical system of Hdi: source-oriented and goal-oriented. Various combinations of the two categories may result in the representation of an event as being [+source oriented, -goal oriented], [+goal oriented, +source oriented], or [+goal oriented, -source oriented]. Depending on the inherent meaning of the verb, these various representations of the event allow for the interpretation of various

arguments as [+affected, +control], [+control, -affected]. Subject control is coded by the point-of-view-of-goal marker *a*, subject affectedness is coded by the point-of-view-of-source marker *u*. Goal orientation is coded through tonal means whether the event is represented from the point of view of goal or not.

Negative clauses can be either pragmatically independent or pragmatically dependent. The two types of clauses have different formal characteristics.

Topicalization differs from focus constructions in that the comment clause on a topicalized element is pragmatically independent, and the comment clause on an element in focus is pragmatically dependent. Relative clause constructions are in many respects identical with focus constructions in that the relative clause is identical with the comment-on-focus clause. Relative clauses encode the existential status of the head noun.

The verb "to say" is omitted from most complex sentences in natural discourse, leaving only the complementizer.

Complex sentence structure employs clausal order to code a difference between *de dicto* and *de re* complements. *De dicto* complement clauses precede the matrix clause, while *de re* complements follow the matrix clause. Subject-to-object raising, or encoding the semantic subject of the complement clause as the object of the matrix clause, is a coding means whose specific function depends on the inherent properties of the verb. Complement clauses also differ from matrix clauses in the system of aspect coding.

We have tried, as much as possible, to provide sources of grammaticalization for each grammatical category. We do this not only because of historical interest but also because an understanding of the sources of grammatical constructions may explain their contemporary form and some of their properties.

2.4 . Discourse structure

It has been claimed (DuBois 1985 and his other writings) that clauses with two full noun phrases are extremely rare in natural discourse. Although we did not conduct a systematic study of discourse, the sample of texts included in the present grammar does not bear out this generalization. Another generalization about discourse is that when a verb appears with a single noun phrase, that noun phrase usually represents the object rather than the agent. This generalization is also not supported by Hdi discourse. When a new noun has been introduced by an intransitive verb, the full noun may occur in the next clause of the same sentence with another in-

transitive verb or with a transitive verb, regardless of the grammatical role of the noun.

Chapter 2

Phonology

1. Introduction

Our aim in the description of the phonology of Hdi is to provide the main principles of the formation of lexical and grammatical morphemes and the rules for the phonetic realization of these morphemes. Accordingly, we provide an inventory of underlying segments and rules about their phonetic realizations. Two factors affect the phonotactics of consonants and vowels in Hdi: syllable structure constraints, and conditions on sequences of consonants and vowels independent of the syllable structure. Certain phonological rules whose scope is limited only to specific morphemes are discussed when the phonetic realization of these morphemes is described. One of these rules is the insertion of a nasal before pronouns beginning with a vowel.

We also describe the function of phonology in the coding of the syntactic organization of language.

2. Consonantal system

2.1. Phonetic consonants

The consonantal inventory includes: glottalized consonants, lateral fricatives, prenasalized stops, simple stops, affricates, and continuants. All series except for glottalized consonants have voiced and voiceless contrasts.

We use the following graphic conventions. In the examples used throughout this sketch, we represent the voiced lateral continuant ɮ as *zl*, in agreement with orthographies used for Cameroonian languages. However, we represent the voiceless counterpart ɬ as *hl* rather than *sl*, as usually represented in Cameroonian language orthographies, because the sequence consisting of the alveolar voiceless continuant and the lateral

liquid *sl* actually occurs in Hdi. Both voiced and voiceless lateral continuants impressionistically end with a stop, voiced and voiceless respectively. Hdi shares this characteristic, not otherwise noticed in the study of lateral continuants, with a number of other Chadic languages spoken in northern Cameroon.

The digraphs *ts* and *dz* represent voiceless and voiced affricates. For purely orthographic reasons we have chosen to represent the voiced velar continuant *γ* as *gh*.

The full phonetic inventory, which does not include sounds found in borrowed words, is represented in Table 1.

Table 1. Inventory of phonetic consonants

	Bilabial	Labial	Alveolar	Palatal	Velar
Stops					
Voiced	*b*		*d*		*g*
Voiceless	*p*		*t*		*k, kw*
Prenasalized	*mb*		*md, nd, ndz*		*ng*
Glottalized	*ɓ*	*'w*	*ɗ*	*'y*	
Affricates					
Voiced			*dz*	*dž*	
Voiceless			*ts*	*č*	
Continuants					
Voiced	*ß*	*v*	*z*	*ž*	*gh*
Voiceless	*f*	*f*	*s*	*š*	*x*
Lateral Cont.					
Voiced			*ɮ*		
Voiceless			*ɬ*		
Nasals	*m*		*n*		*ŋ*
Liquids			*r* *l*		
Glides	*w*			*y*	

2.2. Underlying consonants

Table 2 represents a hypothesis with respect to the inventory of underlying consonants. In the discussion that follows the Table 2 we provide evidence for the phonological status of segments.

Table 2. Inventory of underlying consonants

	Bilabial	Labial	Alveolar	Palatal	Velar
Stops					
Voiced	*b*		*d*		*g*
Voiceless	*p*		*t*		*k*
Prenasalized	*mb*		*md, nd*		*ng*
Glottalized	*ɓ*		*ɗ*		
Affricates					
Voiced			*dz, ndz*		
Voiceless			*ts*		
Continuants					
Voiced		*v*	*z*		*gh*
Voiceless		*f*	*s*		*x*
Lateral Cont.					
Voiced			*ɮ*		
Voiceless			*ɬ*		
Nasals	*m*		*n*		*ŋ*
Liquids			*r*		
			l		
Glides	*w*			*y*	

2.2.1. Bilabial versus labial consonants

Contrast among labial and labiodental underlying segments is provided by the following items: *bízì* 'pubic apron worn by young women', *pìtsákw* 'hoe', *fìtík* 'sun', *tìví* 'road', *víxà* 'sift', *púrkútú ndzúm* 'papaya', *hlə́rpú* 'side', *tf-ú-ú-ghá-tfà-lú* 'one has spit'.

A number of segments from the phonetic inventory appear to be in complementary distribution. The bilabial voiceless fricative has been recorded only in word-initial position when followed by a bilabial glide and vowel *a*: [*ɸ*wáɗ] 'four'. The labiodental [f] occurs in many environments, including the word-initial and word-final position: *fá-m-tà* 'put inside', *fìtík* 'sun, time, day'. We postulate that the bilabial voiceless fricative is a variant of the labiodental fricative, derived by the rule:

Rule 1: f → *ɸ*/ ___ [+round].

The rule states that the labiodental continuant becomes bilabial when followed by either a round vowel or a labial glide. There are no instances of [f] followed by a round vowel in the data. The bilabial voiced continuant has been recorded only in some pronunciations of *v* when surrounded by the high round vowel [u]. Thus there is a variant of the word *dzvú*: [jùßú]

'hand'. We postulate that [ß] is a variant of *v* whose occurrence can be accounted for by the rule:

Rule 2: v → ß/u___u.

All bilabial fricatives will henceforth be represented as *f* or *v*.

2.2.2. Alveolar consonants and palatal variants

There is a contrast between alveolar voiced and voiceless stops before all vowels:

(1)	*tà*	'locative adjunct'	*dà*	'preposition'
	tùm	'big drum'	*xdí*	'self-name'
	tùrtúkw	'one'	*dùssúm*	'root'

Similarly, there is a contrast between alveolar voiced and voiceless affricates:

(2)	*tsá*	'definite marker'	*dzà'á*	'go'
	tsí	'third singular subject'	*vdzí*	'monkey'
	tsúdáy	'dangerous animals'	*dzúmá*	'hay'

There is also a contrast between voiced and voiceless alveolar continuants:

(3)	*sá*	'come'	*zá*	'eat'
	sí	'referential past marker'	*zídìkw*	'fly'
	sù	'drink:SO'	*zù*	'eat:SO'

The palatal continuants *š* and *ž* occur only when followed by front vowels: [gážéngèl] and [géžéngèl] 'a piece of metal, many of which form the pubic apron of a pregnant woman'. We have in our data a few instances of the prepalatal continuants *ç* : [xəç] 'two', in lento speech [xìis]. We therefore take the palatalization of the final consonant to be caused by the preceding long high vowel, which is subsequently shortened to *ə* in a closed syllable. The palatalization of alveolar fricatives may be caused therefore be the a preceding or a following front vowel:

Rule 3: [+alveolar] [+cont] → [+pal]/V[+front].

The rule of palatalization operates only when both the front vowel and the alveolar consonant belong to the same morpheme. The rule does not operate across morpheme boundaries. Thus when the verb *sà* 'drink' is followed by the object *ìmí* 'water', the final vowel of the verb is replaced by the first vowel of the noun, resulting in the phonetic structure [sìmí], not [šìmí] 'drink water'. Since palatal continuants can be derived by rules, we postulate them to be variants of the underlying alveolar continuants [s] and [z].

Alveolar affricates become palatalized when followed by a high vowel. The rule is obligatory for the high front vowel and optional for the high round vowel. Thus [ts] becomes [c] and [dz] becomes [j] before [u] or [i]:

(4) *dz-ù-ɗú-s-dzà* → [*j*-ù-ɗú-s-dzà], [dz-ù-ɗ-ús-dzà]
hit-SO-1SG-INV-hit
'he slapped me' (cf. *dzà* 'hit')

tsí	→ [cí]	'third person singular subject'
jíbìl		'outdoors' may well be underlyingly *dzíbì*
dzvú		after optional vowel insertion → [jùßú] 'hand'

Again, *s* does not palatalize even though it is preceded by a high front vowel. The absence of palatalization is explained by the morpheme boundary's occurring between the two segments. Eguchi 1971 does not make a distinction between palatal and non-palatal voiced and voiceless affricates, and represents them all as *j* and *c* respectively.

2.2.3. Velar consonants

There is a contrast between velar voiced and voiceless stops:

(5)

kà	'sequential marker'	*gà*	'preposition'
kì'yá	'small'	*gìgɗá*	'mix'
kúm	'want'	*gù*	'goat'

The labialized velar [kw] occurs in both word-initial and word-final position. In the latter position it is in contrast with the velar stop [k]:
Word initial:

(6)

k		*kw*	
ká	'complementizer'	*kwá*	'calabash'
kí	'how'	*kwítìkw*	'small'
		kwálá	'lack, fail'

Word final

(7)

mták	'bush'	*ghàtálàkw*	'chicken'
gúɗúk	'together'	*téekw*	'one'
vàzák	'rooster'	*pìtsákw*	'hoe'
tákázák	'man's leather garment'	*tùrtúkw*	'alone'
		kítìkw	'small'

We analyze the labialized velar as the result of high back vowel reduction in word-final position. This reduction applies only to low tone syllables. The rule of labialization could be formulated as follows:

Rule 4: ù → w/C[+velar] ___ #.

The instances of *kú* in word-final position have high tone: *mùkú* 'six', *rákú* 'proper name, feminine'. A cluster analysis of *kw* cannot be maintained, as there are no other word-final clusters in Hdi. Therefore, we postulate *kw* as resulting from labialization of the high back vowel following a velar consonant. Some words in the right-hand (kw) column above are actually pronounced with either a high back vowel or the labial glide: *kítìkw* and *kítíkù* 'small'.

Despite the analysis that derives *kw* from *kù*, we represent the segments as *kw* so as to reflect the phonetic realization and phonetic changes that have taken place. Further support for the proposed hypothesis about the origin of *kw* comes from a more general rule of labialization, as discussed below.

The contrast between the voiceless and voiced velar fricatives *x* and *gh* has been recorded in word-initial and intervocalic position. Both consonants can also occur in clusters with other consonants, stops and continuants alike, but not with each other, thus **xgh* and **ghx*. Members of these clusters have different values for the feature voice. As is the case with other obstruents, there is no voicing contrast in the word-final position. We postulate both *x* and *gh* as underlying segments:

(8)

	Voiceless		Voiced	
Initial	*xkán*	'three'	*ghə́n*	'head'
	xdí	'Hdi'	*ghùáŋ*	'ten'
Medial	*mìndú-xà*	'men'	*tghás*	'eight'

A velar continuant may be palatalized when followed by the palatal glide:

(9) *yá* *vwàx* *yá* → [yá vwàxyá] and [yá vwàx'yá]
DEM field DEM
'that field'

ɓáɓáx *yá* → [ɓáɓáxyá] and [ɓáɓàx'yá]
shoe DEM
'that shoe'

2.2.4. Prenasalized and glottalized stops and affricates

In word-initial position there is a contrast between voiced, voiceless, prenazalized, and glottalized series. Contrast alone, however, is not a sufficient criterion to postulate prenasalized stops as underlying segments. In view of the rich variation in consonant clusters in word-initial and medial positions, one has to decide whether what appears as a prenasalized stop [nd] (or prenasalized affricate [ndz]) is a single underlying segment or a cluster of two segments. One criterion could be the role of the segment as a tone-bearing unit. If a nasal is a tone-bearing unit, we postulate it to be a separate segment. Another criterion is the length of the consonants in lento speech. If, in lento speech, the speaker separates the nasal from the following stop, we consider the nasal to be a separate segment. If the speaker does not separate the nasal from the following stop, we consider the two to be components of one underlying segment, a prenasalized stop. These two criteria have proven to be quite useful. For example, there exist the words *mìndú* 'man' (which was recorded with low-high tone sequence as represented) and *mbítsá* 'proper name, masculine'. Either word could begin with a prenasalized stop or a consonant cluster. Speakers of the language have no difficulty in lengthening the first segment of the word *mìndú*, in effect producing two syllables. However, they cannot lengthen the first segment of the word *mbítsá* to produce three syllables. Therefore, the status of the initial nasal component in *mbítsá* seems to differ from that in *mìndú*. Other examples containing prenasalized stops are *mná* 'say' and *ngá* 'for (preposition)'. The third criterion for deciding whether a given sequence of sounds is a consonant cluster or a complex segment is vowel insertion. In the plural form of the verb the vowel *a* is inserted after the first consonant. Thus the sequence *ngl'* 'mount' consists of two segments, as evidenced by the vowel insertion:

(10) *tà* *ng-á-l-áy* *tá* *plìs-xà*
IMPF mount-PL-PO OBJ horse-PL
'he mounts horses' (singular *nglá*)

(11) *tà* *ngl-áy* *tá* *plìs*
IMPF mount-PO OBJ horse
'he mounts a horse'

Compare the plural form *xáná* 'sleep' of the verb *xná* 'lie down'. According to the criteria listed above, the prenasalized stops should be included in the underlying inventory.

Glottalized consonants are in contrast with non-glottalized consonants. There are, however, instances in which the same word may be produced with either a glottalized or a non-glottalized consonant: *ɓádzá* or *bádzá* 'spoil'. Glottalized glides *'w* and *'y* are not, however, underlying.

There is one prenasalized affricate, *ndz*, recorded in the verb *ndzvá* 'connect, tie'. Although we do not have the plural form of this verb that would have demonstrated affirmatively that *ndz* is one segment, the general phonotactics of consonants argues for its monosegmental structure. There are no three-consonant clusters in word-initial position.

2.2.5. Nasals

There are three phonetic nasals: labial, alveolar, and velar. In syllable-final but not word-final position all three nasals can occur. The alveolar nasal becomes velar in syllable-final position as per the rule:

Rule 5: n → ŋ/ ___ #.

The evidence for velarization is provided by the behavior of the same consonants in intervocalic and in word-final positions. Thus the nasal is velar in word-final position in the isolation form for "child" [zwáŋ]. The plural form is [zwánì], i.e., it has an alveolar nasal. When a word is used in a syntactic construction, its phonetic form in isolation rather than its underlying form is used. Thus when the word *zwán* is used in a genitive construction, the form [zwáŋ] rather than [zwán] is used. The velar nasal is realized as a cluster of a velar nasal and the voiced velar stop [g]. In lento speech the following syllabic division obtains:

(12) *zwáŋ á krì* → [zwáŋ.gá.krì]
child GEN dog
'puppy'

The rule finds additional support in the behavior of foreign words ending in a nasal consonant:

(13) *pàtróŋ á ɗá* → [pàtróŋ.gá.ɗá]
boss GEN 1SG
'my boss'

Not all velar nasals can be accounted for by the rule deriving the velar nasal from the alveolar nasal:

(14) *ŋúhlín* 'white'
kɗiŋà- 'spot, espy'

Because of these and other cases where the two segments are in contrast, we postulate the velar nasal as an underlying segment. It is useful to represent all velar nasals as *ŋ*, whether underlying or derived, as a reminder of how a consonant is pronounced in a given position. Thus the first-person plural exclusive pronoun is represented as *íŋní*, the word for 'child' as *zwáŋ* or *zóŋ*, depending on the actual variant recorded. The contrast between the velar nasal *ŋ* and the prenasalized velar stop *ng* is more difficult to asses. In the prenasalized stop the velar stop is impressionistically much more audible.

2.2.6. Lateral continuants versus stops

The two lateral continuants *hl* and *zl* are in contrast with each other as well as with other consonantal segments. There are no lateral continuants in word-final position, but they do occur in the word-initial and intervocalic position as well as in consonantal clusters, where they are the second component of the cluster. As noted above, the lateral continuants end as stops, voiceless and voiced as appropriate.

2.2.7. Glides

The velar and palatal glides are in contrast in word-initial, intervocalic, and word-final position:

(15) *pákáw* 'leopard'
-áy 'object marker in imperfective'
táw 'cry'

Both glides can occur before low vowel *a*:

(16) *wà* 'negative marker' *yá* 'demonstrative'

Before high vowel *i* the palatal glide occurs only as a member of a consonant cluster, and even then, the number of attested cases is very small:

(17) *myí-xà* 'wives'

There are no cases of a palatal glide followed by the high back vowel *u* other than as a variant of the first-person singular subject pronoun *-íyù*. The presence of the glide in this form may be accounted for by an epenthesis rule inserting a palatal glide between a front and a back vowel.

The labial glide occurs before both front and back high vowels, whether in word-initial position or as a part of consonant cluster:

(18) *wì* 'mouth'
wíg 'take out'
gwì'yán 'elephant'
skwì 'thing'
wù 'interrogative particle'
wúyá 'festival'
wùd 'fight'

Thus, there is a significant asymmetry in the distribution of labial and palatal glides. The glottalized glides *'w* and *'y* have been recorded only when in intervocalic position, preceded by a high front or back vowel and followed by low vowel, described below in the rules of glottal stop insertion.

2.2.8. Glottal stop and glide insertion

The glottal stop occurs in some intervocalic positions and preceding a palatal or a labial glide. It would appear to be in contrast with other consonants. The distribution of the glottal stop is, however, significantly different from that of other consonants in that it occurs only between identi-

cal vowels or between a vowel and a glide that shares with the vowel the features for height or roundness.

(19) *zì'yá* 'smell'
hlí'yá 'leave, move one's household'
kì'yá 'a little'
mì'í 'wives'
ù'wà 'milk'
dzà'á 'go', 'future tense marker'

The glottal stop is an whose function is to preserve the second underlying vowel of the word. Given the rules of vowel replacement, the second vowel would have merged with the preceding vowel if there had been no glottal stop. This rule accounts for the forms *mì'í* 'wives' and *dzà'á* 'go', 'future tense marker'.

If the second vowel is lower than the first vowel, the glottal stop is inserted together with a glide whose features round and palatal are determined by the same features in the preceding vowel. This rule accounts for the forms:

(20) *zì'yá* 'smell'
hlí'yá 'leave, move one's household'
kì'yá 'a little'

The glottal stop insertion also accounts for the phonetic changes that take place at morpheme boundaries:

(21) *mì'í-á* *m̀ghám* → [mì'yá m̀ghám]
wives-GEN chief
'wives of the chief'

The second vowel of the sequence separated by the glottal stop may be replaced by a vowel from the following morpheme, as per vowel replacement ruless described in 5.6 below:

(22) *nù'wà-áy* → [nù'wày]
fatten-PO
'fatten'

(23) *ú'wà-á* *úú* → [ù'wà'ú] and not [ùùú]
milk-GEN 1DU
'our milk'

Two rules operate with respect to labial glides: The underlying labial glide is deleted between a high round and a low back vowel, and a labial glide is inserted between an underlying high round vowel and a low back vowel.

The presence of an underlying palatal glide is also a barrier to vowel replacement.

The word *ùvá* has a variant *wùvá*. The two variants may be instances of either glide insertion or glide deletion. Given the presence of other words beginning with *u*, the variant with the initial glide is probably the result of glide insertion.

The glide formation and the glide deletion rules are independently supported by other data in the language. Rules of glide insertion and glide deletion operate in tandem in other Chadic languages as well (cf. Frajzyngier 1989).

3. Phonotactics of consonants

3.1. The distribution of single consonants

Four positions are relevant for the distribution of consonants: word-initial, intervocalic, word-final, and phrase-final. All types of stops have been recorded in word-initial and intervocalic position. In word-final, phrase-internal position only some obstruents occur. In phrase-final position fewer obstruents can occur than in word-final, phrase-internal position. The distribution of stops is represented in Table 3.

Table 3. Distribution of stops in phonetic forms

	Word initial	Intervocalic	Word final	Phrase final
Voiced	*b, d, g*	*b, d, g*	*b, d, g*	
Voiceless	*p, t, k*	*p, t, k*	*p, k, kw*	*p, k, kw*
Prenasalized	*mb, nd, ŋg*	*mb, ng*		
Nasal	*n, m*	*n, m, ŋ*	*m, ŋ*	*m, ŋ*
Glottalized	*ɓ, ɗ*	*ɓ, ɗ*	*ɓ, ɗ*	

The word-final, phrase-internal position may have consonants whose presence results from the deletion of the final vowel. The word-final, phrase-final position is not the one where the final vowels are deleted; any consonants that occur there represent underlying word-final consonants. The glottalized stops *ɓ* and *ɗ* have not been recorded in phrase-final position, e.g. in the phonetic form of words in isolation. But they are postulated to be in word-final position in the underlying form of words: *pɗ*

'leave an object', *ghúɓ* 'wash an object'. In addition, when the final vowel of a word is reduced in the phrase-internal position, both glottalized consonants can occur in word-final position:

(24) *xàɗ* *kóɓ* *dà* *tsí* *wà*
lack money PREP 3SG NEG
'he/she does not have any money'

Similarly the voiced stops have not been recorded in phrase-final position, but they do occur in word-final, phrase-internal position:

(25) *xàd* *ná*
place DEM
'this place'

Affricates and continuants have a distribution similar to that of stops (see Table 4).

Table 4. Distribution of affricates and continuants

	Word initial	Intervocalic	Word final	Phrase final
Voiced	*z, gh, zl, dz*	*z, gh, zl, dz*	*z*	
Voiceless	*s, x, hl, ts*	*s, x, hl, ts*	*s, x, hl*	*s, x*

3.2. Consonantal clusters

Consonant clusters in Hdi are constrained by the following elements: the syllabic position of the cluster, the place of articulation, the manner of articulation, and the syllabicity of the segment.

There are many more clusters allowed in the syllabic onset than in the syllabic coda. Two-consonant clusters are common in both word-initial and intervocalic position, but there are no clusters in word-final and phrase-final position. The general principle for consonant cluster formation is that the consonants in a cluster should differ maximally, i.e., they should differ in place of articulation, manner of articulation, and syllabicity properties. Manner of articulation alone does not constrain consonant clusters, since all possible combinations of consonants except for liquid-liquid are allowed. Table 5 illustrates clusters allowed as syllabic onsets, as evidenced by their appearance in word-initial position and clusters in intervocalic position. Rows represent the first element in the cluster and columns the second element. The position in parenthesis is the only position allowed for the cluster:

Table 5. Consonantal clusters and manner of articulation

	Stops	Continuants	Nasals	Liquids
Stops	+	+	+	+
Continuants	+	+	+	+
Nasals	+	+	+	+
Liquids	+	+	+ (V V)	-

In word-initial position there may occur two stops: *bgíní* 'bad spirit', *ɗgá* 'thresh', *tɗá* 'pull'; a stop and a continuant: *txá* (Eguchi 1971 *tghá*) 'expel from body', *tghà* 'door'; or a continuant and a stop: *xgá* 'house, compound', *zɗá* 'good'. Clusters with liquids in first or second position are allowed in word-initial and intervocalic position: *lgùt* 'cloth, shirt', *xlá* 'gather', *krì* 'dog'. Affricates followed by continuants are allowed in word-initial position: *tsgh-áy* 'send a thing'. There are very few cases of a continuant followed by another continuant. The cases that have been recorded occur in word-initial position: *ghzú* 'beer made from guinea corn', *ghzl* 'chase'. There are no word-initial voiceless clusters: **xs*, **sx*, **fx*. There are instances of *fx* in intervocalic position as a result of the combination of two morphemes: *xlá-f-xl-í* ' I gathered up'. The absence of word-initial voiceless clusters is explained by the principle of the maximalization of differentiation within a cluster. The word-initial position represents the underlying form of the morpheme, where the maximalization of differentiation operates, while word-medial clusters may represent different morphemes and are not subject to the maximalization of differentiation principle.

3.3. Constraints imposed by place of articulation

Clusters of consonants produced in the same or an adjacent place of articulation are allowed only if the manner of articulation is different. Thus if the same place of articulation is involved and both consonants are stops, they will differ in voicing: *tdá* 'dig', *ɗɗà* 'fall'. If both consonants are produced in the same place of articulation and have the same value for the the feature voice, they will differ in the manner of articulation, e.g., one will be a stop and the other will be a continuant: *kxú* 'smallpox vaccination, vaccination scar' (Eguchi 1971, *kxá* 'smallpox scar'). Clusters formed by consonants produced in non-adjacent places are allowed regardless of the manner of articulation, with an interesting constraint to be described shortly. Table 6 represents allowed and disallowed clusters from the point of view of the place of articulation.

Table 6. Consonantal clusters and place of articulation

	Bilabial	Labial	Alveolar	Velar
Bilabial	-	-	+	+
Labial	-	-	-	+
Alveolar	-	stop-cont.	+	+
Velar	-	-	+	-

Two consonants in a cluster may have different values for the feature voice: *sná* 'know, hear', *xná* 'slaughter', *dzáwá-p-dzáwá* 'he sold it'.

Three-consonant clusters are allowed in the following configurations: continuant-stop-stop, stop-continuant-stop, stop-stop-stop. All three consonant clusters are allowed only in word-medial position, always representing a combination of different morphemes:

Nasal-stop-stop:

(26) *kd'-í-n-kd'à*
'finish-AWAY-3-finish'
'he finished it'

Continuant-stop-stop:

(27) *kd'á-f-kd'á* *sárák . . .*
finish-UP-finish whip
'the whip finished . . .'

Nasal-continuant-nasal:

(28) *snà-n-sn-íyù*
hear-3-hear-1SG
'I heard'

Continuant-continuant-sonorant:

(29) *xlá-f-xl-í*
gather-UP-gather-1SG
'I gathered up . . .'

Nasal-stop-continuant:

(30) *pgh-ì-n-pghà* *tá* *hlú'wí*
put-AWAY-3-put OBJ meat
'she threw away meat'

With respect to stops, the following constraint obtains: Within the same morpheme the first consonant has a place of articulation in front of the place of articulation of the following consonant counting from the labial region. Thus, *pd*, *bg*, and *dg* are allowed, but **db*, **dp*, **gb*, and **gd* are not. Examples follow:

(31) *dgá* 'divide'
kà bgà 'because'

When two consonants belong to different morphemes, back consonants may occur before front consonants. Thus the inner space extension *g* [k] may be followed by the referential suffix *-tá*:

(32) *klà-k-tá . . .*
bring-INN-REF
'he/she brought it . . .'

The order of continuants and stops is not determined by the place of articulation of segments:

(33) *txá* 'expel'
ksá 'take'
ɗvá 'like, want'

With respect to continuants and affricates both orders are possible:

(34) *màxtsím* 'tomorrow'

Geminate clusters are allowed:

(35) *ǹghà-n-ǹgh-í* → [ǹghà-nǹgh-í]
see-3-see-1SG
'I saw him'

3.4. Constraints imposed by the manner of articulation

In addition to the place of articulation, there are also constraints with respect to the secondary characteristics of consonants that prevent certain clusters from occurring. Clusters consisting of glottalized consonants

followed by lateral continuant are disallowed: **ďhl*, **ďzl*. If such a cluster were about to occur, an epenthetic vowel would be inserted.

Three-consonant clusters consisting of a stop-stop-stop or stop-liquid-stop are disallowed. Hence there are no clusters of the form: **ptk*, **bdg*, **bgd*, etc., or **kld*, **klg*, **klm*, etc.

4. Consonant devoicing

A voiced consonant becomes voiceless when not followed by a sonorant in a syllabic coda:

Rule 6: C [+voice] → [-voice]/___[-son].

Evidence that this rule is conditioned by the syllabic position rather than by the consonantal environment is provided by the existence in syllabic onsets of clusters whose consonants have different values for voice. Compare the behavior of the inner and down extension *gá*:

(36) *vrà-gá-vr-í* *dzághà*
return-INN-return-1SG home
'I returned home' (from a higher elevation)

When the extension is not followed by a vowel, the velar consonant is voiceless even when following a vowel and preceding a voiced consonant:

(37) *vrà-k-vr-í* *dzághà*
return-INN-return-1SG home
'I returned home' (from an equal elevation, said at the place to which the subject has returned)

Consider also the "movement out" extension *b* as it occurs with the verbs *sá* 'come' and *lá* 'go'. The evidence for the underlying voiced quality of the consonant of the extension is provided by morphemes when the extension is followed by a vowel:

(38) *sá-bà* *á* *wà*
arrive-OUT NEG NEG
'he did not come out'

The marker of "movement out" extension has two forms, The voiced *b* with the verbs of movement *sá* 'arrive' *lá* 'depart' and voiceless *p* with all

other verbs. The voiced variant of the extension with the verbs *sá* and *lá* becomes voiceless before a voiceless obstruent:

(39) [sá-p-sà]
arrive-OUT-arrive
'he came out'

Before a sonorant extension, *b* stays voiced:

(40) *lá-b-là*
go-OUT-go
'he went out'

5. Vowel system

The phonetic vowels are *a*, *ə*, *i*, *u*, *e*, and *o*. The two mid vowels are rare. The only words containing *o* in our data are borrowings: Thus for *gwár* 'cola nut' a variant [gór] has been recorded. Both forms are borrowings either from Fula *gooro* or Hausa *goro* 'cola nut'; *kóɓù* 'money', a Hausa borrowing; and the occasional variant *ghòzú* for *ghzú* 'beer' (*bilbil* in northern Cameroonian French).

Only a few words in our data contain the underlying front mid vowel *e* (which is lower-mid rather than higher-mid): *dèrí* 'hat', *bèkúlà* 'bulbul'. Some of these words may be borrowings. The noun *bèkúlà* must be related to *bokulay Pycnonotus barbatus* (Pycnontides), *bulbul commun* in Mafa (cf. Barreteau and le Bleis 1990: 87). The word *dèrí* 'hat' is certainly related to the word *dara* 'hat, fez' commonly found in the area (Margi, Hoffmann 1963; Hausa, Abraham 1962). Many instances of phonetic *e* appear to be the product of lowering of the high front vowel *i* in closed syllables: *dímdím* or *démdém* 'all'. Since we cannot account for all instances of *e* as a borrowing or a product of the lowering rule, we postulate *e* as an underlying vowel.

The high central vowel *ə* is fully predictable in the verbal system, where it is inserted by the requirements of tone realization and syllable structure constraints. In the nominal system schwa is in contrast with other vowels: *ghən* 'head', *lghúŋ* 'a type of yellow cake'. Thus although with respect to verbs, we do not postulate schwa to be part of the underlying structure, with respect to nouns there is no choice, unless one would postulate vowelless underlying structures with schwa inserted by epenthesis rules. We postulate therefore that some schwas are inserted and that others are part of the underlying structure (see Table 7).

Table 7. Inventory of underlying vowels

Front	Central	Back
i	*ə*	*u*
e		*a*

Evidence of vowel contrasts is provided by the following pairs of lexical items representing open and closed syllable environments:

(41) *tà* 'preposition'
kwítíkw 'small'
krì 'dog'
-kú 'absolutive marker'

(42) *mghám* 'chief'
tùm 'big drum'
təm 'onion'
ngúdùf 'heart'
txùrúm 'rat'

5.1. Vowel raising

The low vowel *a* may be raised to *e* when followed by a palatal glide, as evidenced occasionally in pronunciation of the imperfective object marker *-áy*. The raising has been observed in speech of some speakers:

(43) *gùy-áy-mú* *tá* *vghá* → [gùy-éy-mú]
meet-PO-1PL.INCL OBJ body
'let us meet'

(44) [xn-áy] or [xn-éy]
cut-PO
'slaughter'

The sequence *ay* may be reduced to [e] in fast speech:

(45) *tà* *z-áy-z-áy-lú* → [zé-zé]
IMPF eat-PO-eat-PO-UH
'they are eating'

The form [zé] coexists with [z-áy]. The raising rule is optional. Most forms do not raise *a* when it is followed by *y*: *zb-áy* 'choose', *kúm-ày* 'like, want', *tsúdáy* 'animals dangerous to man'.

5.2. Vowel lowering

Sporadic vowel lowering takes place when a high vowel is followed by a low vowel. The high vowel may be lowered one step:

Rule 7: V[+high] → [-high] / ___CV[+low].

(46) *ghùzú-á kwálábá* → [ghòzá kwálábá]
beer-GEN bottle
'bottled beer'

Vowel lowering may also be caused by low consonants, viz. velar continuants and the glottal stop; thus, *i* becomes *e* when followed by a low consonant:

(47) *stìxá* → [stìxá] and [stèxá]
'kidneys'

5.3. Vowel rounding

The high vowel becomes round when followed by the round glide within the same morpheme or across a morpheme boundary within the same phrase. The following rule accounts for this process:

Rule 8: V[+high] → [+round] /___w.

It is not possible to determine whether the vowel that becomes round is underlyingly front or schwa. Given the fact that the final non-grammatical vowels are deleted in phrase-internal position (cf. 5.7 below), and that schwa is inserted for syllabification, the examples below may represent equally well the rounding of the front high or central high vowel:

(48) *xàɗú ìmí wà* → [xàɗímúwà]
lack water NEG
'there is no water'

(49) *xàní wà* → [xànúwà]
sleep NEG
'he does not sleep'

(50) *xdí á ká tsì wà* → [xdá-á-ká tsù-wà]
Hdi NEG COMP 3SG NEG
'she should not be a Hdi'

The vowel rounding rule does not apply when *i* is the only component of a morpheme, as in the case of the first-person singular marker:

(51) *xàɗú xìyá ŋní dà í wà* [*íwà*]
lack guinea corn 1PL.EXCL PREP 1SG NEG
'we have no guinea corn at my place'

5.4. Vowel fronting

The high central schwa is fronted when followed by the palatal glide *y*. The rule applies to schwas that have been inserted after word-final vowels were deleted, as per rule described in 5.7. below:

(52) *mɨ̀ndú yà* → *mɨ̀ndə́ yà* → [mɨ̀ndíyà]
man COP
'it is a man'

(53) *ɗgú yà* → *ɗgə́ yà* → [ɗgíyà]
threshing COP
'it is threshing'

5.5. Vowel epenthesis

Three factors motivate vowel epenthesis: syllable structure conditions, consonant clusters constraints, and the realization of grammatical tone.

The syllable structure condition requires a vowel insertion if a disallowed syllable structure were going to occur as a result of the affixation process. Thus if a disallowed syllabic onset or coda were going to emerge, an epenthetic vowel must be inserted. The tone realization conditions require a vowel insertion, if the absence of the tone were about to affect the grammatical coding that is realized by the tone. The consonant cluster constraint requires epenthesis if a disallowed cluster were about to emerge.

The syllabification process takes place from left to right. The vowel is inserted in the first place where the violation of the syllabic structure oc-

curs. The vowel from the next syllable is copied into the disallowed position or into the first position that requires a tone realization:

(54) *klʹ-g-í-dʹ-á-ghà* *ìmí* → [klígídʹághà]
take-INN-AWAY-1SG-PVG-D:PVG water
'bring me some water!'

(55) *klʹ-g-ì-xà* *ìmí* → [klígìxà]
take-INN-1SG-DOWN water
'bring me down some water!'

If the syllable does not have its own tone, the tone of the epenthetic vowel the same as the tone of the source from which the vowel is copied (cf. 7.4 below):

(56) *b-d-í-dʹ-f-bà* → [bídídʹífbà]
build-ALL-AWAY-1SG-UP-build
'he built me [a wall]'

The epenthetic vowel is *a* if the vowel in the next syllable is *a*:

(57) *mà* *kl-à-d-á-f-ká* → [mà klàdáfká]
PROH take-EP-ALL-PVG-UP-2SG
'do not take it up there'

If the tone position is the last position in the word, that is, if there is no following syllable in the same word, the epenthetic vowel is schwa. Thus when the negative auxiliary *xàdʹú* is followed by a subject enclitic, the final vowel *u* is deleted because it is in phrase-internal position, but it is replaced by schwa because of the need to code high tone before the following subject:

(58) *xàdʹ* *ŋní . . .* → [xàdʹə-ŋní]
lack 1PL.EXCL
'we do not . . . '

Whether a vowel in a given structure is epenthetic or underlying can be determined only from the morphological and syntactic structure of the verb.

Syllable onsets with a consonant followed by a sonorant are disallowed. To prevent such clusters an epenthetic vowel is inserted. For the sonorant *y* the *i* is inserted according to the rule:

Rule 9: Ø → *i* /C___#*y*.

For example, the interrogative marker for non-human participants is *ń*. When the marker is followed by the copula *yà*, the vowel *i* is inserted:

(59) *ń* *yà* → [níyà]
what COP

Sonorant *l* is transparent with respect to vowel insertion. The epenthetic vowel is identical with the vowel following the sonorant:

(60) *vrà-k-vŕ-lú* → [vrà-k-vr-ú-lú]
return-INN-return-UH
'they returned' (high tone n the epenthetic vowel because it precedes a subject pronoun)

When the [-human] interrogative *ń* is followed by a word beginning with a consonant, an epenthetic vowel is inserted. The epenthetic vowel is identical with the first vowel present to the right of the interrogative marker:

(61) *ń* *z-ú-ká* *nà* → [n-ú-z-ú-ká nà]
what eat-SO-2SG Q
'what did you eat?'

5.6. Vowel replacement

The morpheme-final vowel is replaced by the initial vowel of the following morpheme if the two belong to the same phrase:
Rule 10: V_1 → V_2/ ___ #V_2.

The rule always operates in fast speech. When the associative plural marker *ì* in subject position follows complementizer *ká*, the result in normal speech is the sequence [kî]. In slow speech it is [ká ì]. The tone of the morpheme whose final vowel is replaced remains and is realized on the new syllable. The final vowel replacement may result in one vowel or

two vowels, viz., the sequence V_1+ V_2 may result in V_2 or in V_2V_2. In normal speech only one vowel is produced after replacement. In lento speech two vowels are rearticulated. Both of these cases are illustrated by the following examples:

(62) *tá* *ìmí* → [tímí]
OBJ water

(63) *ndá* *ǐ'í* → [ndíí]
ASSC 1SG
'with me'

(64) *tá* *ù'wà* → [túù'à]
OBJ milk

(65) *sà* *ìmí* → [sìímí]
drink water
'to drink water'

The first-person singular object marker *-íxà* and the subject clitic *í* replace the final vowel of the verb. Thus, when the first-person benefactive pronoun is added to the verb *pd'á* 'to leave some' with the goal-oriented marker *á*, the vowel of the verb is replaced by the vowel of the pronoun:

(66) *pd-íxà-pd'á*
leave-1SG-leave
'he left it for me'

Subject clitics:

(67) *ǹghà-n-ǹgh-í* *tà* *lúmá*
see-3-see-1SG PREP market
'I saw him at the market'

(68) *ndùs-íyù*
close-1SG
'I am close' (cf. *ndùsá* 'close')

Vowel replacement affects not only lexical vowels but also grammatical morphemes. The following example has two replacements: the lexical vowel *i* by the genitive morpheme *á* and the genitive marker *á* by the

vowel of the first-person dual. The lexical low tone of the word *krì* 'dog' remains stable throughout these replacements:

(69) *krì-á-ú* → [kràú] and [krùú]
dog-GEN-1DU
'our dog'

The liquid *l* is transparent with respect to vowel replacement, i.e., the vowel following the liquid replaces the final vowel of the preceding morpheme. The vowel replacement is, however, not obligatory:

(70) *tà lúmá* → [tùlúmá] and [tà lúmá]
PREP market
'at the market'

(71) *tf-ú-'ú-ághá-tfá-lú* → [tf-ú-'wá-ghá-tfú-lú]
spit-1DU-D:PVG-spit-UH
'we (1DU:INCL) were blessed'[1]

The interrogative 'where' is *gá*, as attested by examples in which this word is followed by a consonant-initial morpheme. But when *gá* is followed by a vowel-initial morpheme, the vowel *a* is replaced by the vowel of the following morpheme:

(72) *gá íí nà* → [gíínà]
where 1SG Q
'where am I?'

Another vowel-initial morpheme is the first-person dual marker *úú*. When it is added to a verb, the vowel of the verb is replaced by *u*:

(73) *zú-úú-zá* → [zú-ú-zá]
eat-1DU-eat
'let us eat!'

(74) *sù-úú-sà* → [sùúsà]
drink-1DU-drink
'let us drink'

5.7. Vowel deletion

In phrase-internal position the morpheme-final vowel is reduced. Thus the interrogative marker *wà* 'who' is realized as [w] in phrase-internal position:

(75) *slá-á* *wà* *nà* → [sláwnà]
leg-GEN who Q
'whose leg?'

When the vowel reduction would result in a disallowed consonant cluster, a schwa is inserted. Consider the word *m̀ndú* 'man'. In phrase-internal position the final vowel is deleted. But if the following word begins with a consonant cluster, a schwa is inserted. The schwa assumes the tone of the syllable to which it is added:

(76) *m̀ndə́* *rxá*
man wise
'wise man'

The situation is similar for monosyllabic words that begin with a consonant cluster. When such words are followed by a word beginning with a consonant, vowel deletion would result in a three-consonant cluster in word-initial position. An epenthetic schwa is therefore inserted to satisfy syllabification rules:

(77) *xdí* *xə̀n* → [xdə́xə̀ŋ]
Hdi 3PL
'these are Hdi people'

5.8. Glide formation

A high back vowel þecomes a glide after a velar, labial, or liquid consonant and before *a*, according to the rule:

Rule 11: u → w/C[+velar, labial, liquid] ___ (C)a.

(78) *gù* *á* *wà* → [gwà á wà]
goat NEG NEG
'it is not a goat'