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▶ **To cite this version:**

Aimée Lahaussois. Examining approaches to describing complex verbal morphology for an unwritten language. Bernard Colombat; Bernard Combettes; Valérie Raby; Gilles Siouffi. Histoire des langues et histoire des représentations linguistiques, Honoré Champion, 2018. hal-01895550

HAL Id: hal-01895550

https://hal.science/hal-01895550v1

Submitted on 15 Oct 2018

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To appear in *Histoire des langues et histoire des représentations linguistiques*. Colombat, Bernard, Combettes, Bernard, Raby, Valérie and Siouffi, Gilles (ed). Paris: Honoré Champion

Examining approaches to describing complex verbal morphology for an unwritten language

In this presentation I compare the effectiveness of two descriptions of the verbal system of Khaling Rai, a language of Nepal. The verbal morphology of Khaling is notoriously complex, indexing both agent and patient on transitive verbs, and with a unique verb stem alternation patterns. Yet because of the exclusively oral nature of the language, there is no written record that can be explored; diachronic data based on reconstruction can however provide insights essential for explaining complex synchronic phenomena.
The larger questions I will explore are how the grammatical models one brings to a descriptive context affect the effectiveness of the description of a verbal system.
Key words: oral languages, verbal morphology, language description, reconstructed verb roots

Dans cette présentation, je comparerai l'efficacité de deux descriptions du système verbal du khaling rai, une langue du Népal oriental. La morphologie verbale du khaling est particulièrement complexe, avec indexation de l'agent et du patient sur les verbes transitifs, et des alternances de thèmes. La nature orale de la langue a pour conséquence que les seules données diachroniques disponibles proviennent de la reconstruction interne. Ces données sont néanmoins essentielles pour rendre compte de la complexité du système.
Les questions plus larges abordées sont comment le modèle grammatical du descripteur, qu'il soit conscient ou inconscient, peut affecter la description et l'utilisation qui peut en être faite.
Mots clés : langue orale, description linguistique, reconstruction interne

1. Introduction

The goals of this paper are three-fold: to examine two different descriptions of the verbal morphology of Khaling Rai; to reflect on the use of diachronic data, specifically the use of reconstructed verb roots, and how this shapes the analysis and affects its use, particularly within the context of an oral language for which there is no attested diachronic data; to explore the question of what constitutes a good description of a verbal system.
The language which will be the subject of this study is Khaling Rai, a Tibeto-Burman language spoken in Eastern Nepal by some 10,000 people. It is a traditionally oral language, with recent orthography development based on devanagari. There are no historical written sources for Khaling: any diachronic data on the language is obtained through internal reconstruction or comparison with related languages.
There have until now been only two major descriptive efforts for the Khaling language. The first (and still ongoing) project has been carried out by S. Toba & I. Toba since the 1960s, with the main goal of translating the New Testament into Khaling. The more recent description project was begun in 2011 by G. Jacques & A. Lahaussois[1], with an entirely linguistic focus and a special emphasis on verbs and their morphology.

[1] We are fully aware of the ethical issue that arises from the fact that the author of the present article is also the co-author of one of the descriptions under review. Unfortunately the paucity of data on Kiranti languages, and the

The structure of the article will be the following: Section 2 will present the basics of the verbal morphology of Khaling Rai. Section 3 will present the two descriptions of the verbal system, looking in particular at how they present data on verb stem alternation and agreement marking morphology, the two crucial elements needed for producing correct verb forms. Section 4 will compare the two descriptions, after some consideration of what the essential features of a good verbal description are, and determine how each description fares with respect to the criteria which have been established.

2. Khaling Rai: Basics of verbal morphology

There are number of characteristic features of Khaling's verbal morphology, the first being that there are distinct intransitive and transitive endings: the agreement affixes that mark the person and number of the agent and/or patient of the verb vary according to transitivity. When the verb is transitive, the agreement affixes indicate the person and number of both the agent and the patient. This can be seen in the examples below, where the agreement suffixes vary with both agent and patient.

sed-u, 'I kill him'
sed-unu, 'I kill them'
sên-nɛ, 'I kill you'

In addition to personal endings, verb also have a number of different stems. This can be seen in the examples above, where the two illustrated stems for the verb 'kill' are *sed* and *sên*, but other stems are also found for this verb: *sets, seç, sê:, sê:t, ses, sêj, se:d.* Other distinctive features involve dual marking (in addition to singular and plural), an inclusive vs exclusive distinction (contrasting non-singular 1st persons that include or exclude the addressee). There are only two tenses marked on Khaling verb, non-past and past, with aspectual distinctions made through verb compounding.

3. Khaling descriptions

The first mentions of Khaling appear to be a 1857 wordlist by Hodgson, within the context of a comparative lexical project for languages of Nepal, and then later in the Linguistic Survey of India, a large-scale effort under the supervision of Grierson. Volume III (1909) is on the Tibeto-Burman family, and one of the major categorization tools used for Himalayan languages is to separate them into 'non-pronominalized' and 'complex pronominalized' languages, the latter being those which index subject and object on the verb. This important feature of some Tibeto-Burman languages was thus already identified in the early 1900's, and provided a basis for classification.
As far as Khaling is concerned, the very brief description in Grierson 1909 (which is just over one page in length) lists a few examples which make clear the author is aware that both agent and patient are indexed in verbs: "sede, kill; sechi, kill ye two" (1909: 371).

3.1 I. Toba's 1973 "The Khaling verb".

This very short article, which totals 14 pages, has the following layout:

I. Suffixes
- A Finite suffixes
- B Infinitival suffixes

II. Enclitics
III. Compound stems

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uniqueness of a situation where two competing (although historically sequential) descriptions exist for one language, makes this a necessary evil. This study is undertaken with as much objectivity as possible.

IV. Other auxiliary constructions
V. Verb stem alternations
    A Formation of the infinitive stem
    B Formation of the finite stem
    C Formation of the finite forms
VI. Personal endings

Section IA on finite suffixes does not, as one might expect, deal with agreement markers, but rather describes aspectual morphemes which can be added to finite verbs. The relevant sections of the article for the purposes of our study are sections V and VI, which deal with verb stem alternation and agreement marking.

3.1.1. Toba: verb stem alternation

Toba identifies five verb classes, which "depend on the final consonant of the base and differ in regard to morphophonemic changes that take place between the base form and the various stem forms." (1973: 7). The classes are made on the basis of the morphophonology of the base form and of the rules that transforms the input into an infinitive stem, and are the following: (1) "base-final cluster[s] of two stops" (which elide and assimilate); (2) "base-final cluster[s] of nasal and stop" (which "elide[ ] and vocalize[ ] the nasal to y unless the nasal is m or the vowel is u"); (3) "a single base-final anterior (non-velar) resonant"; (4) "a single base-final anterior stop" (which "changes into a nasal and the vowel changes"); (5) "a single base-final non-anterior sonant". According to this system, illustrated through a table reproduced below, a verb can have three stems, including the base.

The labels for the stems are fairly transparent, although it is never explicited how to obtain the base. The infinitive stem label is self-explanatory, and the finite stem "underlies most of the finite forms except the plural forms of first and second person; they take the infinitive stem as their base." (1973: 8) Some later statements make it clear that the organization and labeling of stems is somewhat opaque in reality: "In general, singular and dual forms are derived from the finite stem, and plural forms from the infinitive stem" (1973: 9)

	Base	Infinitive	Finite Form	Gloss
1.	'lätt-	'län-ne	'lätt-u	take out
	bredd-	bren-ne	bred-u	tear
	'krapt-	'kram-ne	'krapt-u	cut
	kwaabd-	kwaam-ne	kwaabd-u	cover
	'cakt-	'cu-ne	'cakt-u	know
	'chukt-	'chu-ne	'chukt-u	point
2.	'send-	'sey-ne	'send-u	see
	'pand-	'pay-ne	'pand-u	pound
	thund-	thu-ne	thund-u	prick
	mamd-	mam-ne	mand-u	remember
3.	'khol-	'khwaal-ne	'khol-u	transport
	phlom-	phlwaam-ne	phlom-u	knead
	lem-	lem-ne	lem-u	entice
	khlum-	khlam-ne	khlum-u	bury
	'kur-	'kar-ne	'kur-u	carry
	'pher-	'pher-ne	'pher-u	sew
	'cir-	'car-ne	'cir-u	pile up
	'dil-	'dal-ne	'dil-u	wrap
4.	'lop-	'lwaam-ne	'lob-u	catch
	'tup-	'tam-ne	'tub-u	play music
	'hip-	'ham-ne	'hib-u	cut
	'pot-	'pwaan-ne	'pod-u	tie
	'thut-	'than-ne	'thud-u	pull
	'pit-	'pan-ne	'pid-u	fetch
5.	'brok-	'bro-ne	'brog-u	break
	'phuk-	'phu-ne	'phug-u	raise
	'yik-	'yu-ne	'yig-u	grind
	phing-	phu-ne	phing-u	send
	tung-	tu-ne	tung-u	drink
	jaang-	jö-ne	jaa-ngaa	eat
	maang-	mü-ne	maa-ngaa	make
	töng-	tö-ne	tö-ngaa	put
	lüng-	lü-ne	lü-ngaa	feel

Figure 2. Khaling verb classes.

3.1.2 Toba: personal endings

The section on personal endings is essentially made up of two tables: one showing both transitive (« agentive ») and intransitive (« nonagentive ») endings for the various person/number combinations of the subject or agent, and a second table which indicates the various first person forms of some sample verbs from the five verb classes. The first of these tables is shown below.

		Agentive	Nonagentive	
1st person				
singular		-u	-ngaa	
dual	inclusive	-si	-yi	
	exclusive	-su	-yu	
plural	inclusive	-ki	-ki	
	exclusive	-kaa	-kaa	
2nd person		(interrogative)		(imperative)
singular		-ü	-ø	-eye
dual		-si	-yi	-siye
plural		-ni	-ni	-nuye
3rd person				
singular		-ü	-ø	
dual		-su	-su	
plural		-nu	-nu	

Figure 4. Personal verb endings.

As can be seen, it presents the (non-past) agreement suffixes which index person and number for both transitive and intransitive verbs, according to the person (1st, 2nd, 3rd) and number (singular, dual, plural, with inclusive vs exclusive contrast for the 1st person non-plural) of the subject or agent.

3.2 Jacques et al 2012 « An overview of Khaling verbal morphology ».
This article is, at 75 pages, considerably longer than Toba 1973, and the outline of the article is as follows:

- Introduction
- General overview
- Phonology
- Verb morphology: the affix paradigm
- Verb roots and stems
    - Internal reconstruction of verb roots
    - Consonantal alternations
    - Vowel alternations
    - Synthesis
- CVC intransitive verbs
- CVC transitive verbs
- CVCt transitive verbs
- Open root verbs
- Conclusion

Unlike the Toba article which delves immediately into verbal morphology, the Jacques et al article begins by laying out some basic concepts which form the basis for the analysis (but are corroborated by data from other Kiranti languages, see among others

Doornenbal 2009, Lahaussois 2011, Michailovsky 1975, Schackow 2015): Khaling verbs are essentially monosyllabic roots with a generic template CVC (although a number of variations are possible, so that the actual template is more (C)(C)V(C)), and the verb rime (-VC) and transitivity are relevant to verb stem alternation patterns.

3.2.1 Jacques et al: verb stems

In order to be able to predict all the stems that are actually found in the language, a reconstructed root is posited for each verb (this is similar to Toba's "base" even though the notion of base was not defined in the 1973 article). As with Toba, morphophonological rules (such as voicing, affrication, fricativization, nasalization, lenition, simplification, assimilation for root consonants, and fronting, opening, backing, centralization, for root vowels) make it possible to derive a verb's various stems from the reconstructed root.

The following table shows, in its 4 columns respectively, the 1sg non-past transitive form, the 3sg non-past intransitive form, the infinitive form and the final consonant of the reconstructed root.[2] The table shows the relationship between certain forms and the reconstructed root, revealing that although there is considerable neutralization in the infinitive forms (note that the infinitives in lines 1 and 9, and 4 and 12, and 5 and 13, etc are identical in form), the 1sg non-past transitive makes it possible to retrieve morphophonological information important for correct assignment of verbs into classes.

Table 9: The reconstructed root final consonants for each alternation set

	1SG>3SG.NPST (TR)	3SG.NPST (IT)	INF	Reconstructed Cf
1	Ceg-u	Cê:	Cê:nɛ	k
2	Ceb-u	Ce:p	Cêmnɛ	p
3	Ced-u	Cêj	Cênnɛ	t
4	Ceŋ-u	Cēŋ	Cē:nɛ	ŋ
5	Cem-u	Cēm	Cēmnɛ	m
6		Cēj	Cējnɛ	n
7	Cer-u	Cēr	Cērnɛ	r
8	Cel-u	Cēl	Cēlnɛ	l
9	Cekt-u		Cê:nɛ	kt
10	Cept-u		Cêmnɛ	pt
11	Cett-u		Cênnɛ	tt
12	Cēnd-u		Cē:nɛ	ŋt
13	Cēmd-u		Cēmnɛ	mt
14	Cēnd-u		Cējnɛ	nt
15	Cērd-u		Cērnɛ	rt
16	Cēld-u		Cēlnɛ	lt

For lines 10 and below, the reconstructed root final consonant is a cluster, the second element of which is a t. This in fact reflects an ancient (causative/applicative) derivational suffix –t which has become inflectional, resulting in two types of transitive[3] verb roots: CVCt verbs as well as the generic root template CVC.[4] The following pairs (presented in their reconstructed root form) show the increased valence (consistent

[2] Empty cells in the table signal forms which are not found: there are no transitive verbs with a final root consonant -n in Khaling, nor are there intransitive forms for verbs whose reconstructed root ends in final consonant + t.

[3] The semantics of the causative/applicative suffix dictate that it is only found on transitive verbs.

[4] The phenomenon, found in other Kiranti languages, is discussed at length in Jacques 2015.

with earlier causative derivation) found with CVCt verbs: the CVCt verb is the second in each pair.

khət 'go' vs khətt 'take away'
məp 'spill, intr' vs məpt 'spill, trans'
lem 'be sweet' vs lemt 'comfort'

The distinction between CVC and CVCt verbs is crucial to being able to explain verb Khaling verb stem paradigms, because of the afore-mentioned neutralization between CVC and CVCt verbs that occurs in many parts of the paradigm (including, importantly, infinitive forms). Without the distinction which the reconstructed root makes possible, it is impossible to explain the different stems found among some verbs which have identical infinitive forms but conjugate differently.

3.2.2 Jacques et al: Personal endings

The analytical presentation of personal endings found in Jacques et al is in the form of paradigms such as the following, which illustrate the affixes for intransitive and transitive conjugations respectively. Intransitive paradigms are, as far as the personal endings are concerned, fairly straightforward, as they involve only the person and number of the single argument of the intransitive verb, namely the subject (although distinct paradigms are needed for non-past and past endings). Transitive paradigms, on the other hand, are more complex in that they must show the different personal endings for any possible combination of agent and patient.

The following transitive paradigm follows a model used in all recent grammars of Kiranti languages[5]: The person/number of the agent is in the vertical column, and the person/number of the patient in the horizontal row. The cell at the intersection of the relevant agent and patient shows the personal ending (in the table below, these are illustrated with a verb root as well). Because non-past and past paradigms are different, the endings are presented in distinct tables.

[5] The question of when this style of paradigm presentation came into being is an interesting one, and the subject of a study currently underway on paradigms in languages with double argument marking. For Kiranti, Allen's 1975 grammar of Thulung presents the data in this style, with agent vertically and patient horizontally. All other scholars of Kiranti languages following him use the same presentational style.

Table 5: Transitive non-past paradigm: |lop| 'to catch'

	1S	1DI	1DE	1PI	1PE	2S	2D	2P	3S	3D	3P
1S						loɔ̃m-nɛ	loɔ̃m-su	loɔ̃m-nu	lob-u	lob-usu	lob-unu
1DI										ləp-i	
1DE						ʔi-loɔp	ʔi-ləp-i	ʔi-loɔ̃m-ni		ləp-u	
1PI										loɔp-ki	
1PE						ʔi-loɔp	ʔi-ləp-i	ʔi-loɔ̃m-ni		loɔp-kʌ	
2S	ʔi-loɔ̃m-ŋʌ								ʔi-lə̃:b-ʉ	ʔi-lə̃:p-su	ʔi-lə̃:p-nu
2D	ʔi-loɔ̃m-ŋʌsu									ʔi-ləp-i	
2P	ʔi-loɔ̃m-ŋʌnu									ʔi-loɔ̃m-ni	
3S	ʔi-loɔ̃m-ŋʌ	ʔi-ləpi	ʔi-ləpu	ʔi-loɔp-ki	ʔi-loɔp-kʌ	ʔi-loɔp	ʔi-ləp-i	ʔi-loɔ̃m-ni	lə̃:b-ʉ		
3D	ʔi-loɔ̃m-ŋʌsu									lə̃:p-su	
3P	ʔi-loɔ̃m-ŋʌnu										lə̃:p-nu

It is noteworthy that there are empty cells in the tables. These are person/number combinations for agent and patient which take reflexive endings instead of standard transitive endings, or a non-viable situation such as when an inclusive pronoun combines with a second person (rejected by speakers because the second person is included in the inclusive pronoun).
Of note in observing the transitive paradigms is the prefix ʔi-, which indexes a) a 2nd person or b) an inverse situation, in which the agent is lower than the patient in the 1>2>3 person hierarchy.[6]

4. Comparison of the two descriptions
In comparing the two descriptions we have briefly discussed above, it is important to first consider a fundamental question, namely what it is that makes a good description of a verbal system. This is a question which has not received much treatment in the linguistic literature, probably because the answer is entirely dependent on the descriptive goals (whether explicitly set out or implicit based on the type of description or the context of its production). In *The Art of Grammar*, Aikhenvald lists the building blocks of grammar (2015: 13): collection of data and their description, explanation, prediction. While these are useful criteria to bear in mind while preparing a grammatical description, and they provide a checklist for the evaluation of a description, they do not allow us to make a fine-grained analysis of how two grammars of the same language compare in terms of their success in describing a phenomenon.
Although the concepts underlying them are quite general, the criteria listed hereafter are specific enough that in the case of the Khaling verb descriptions, we can use them to tease apart the differences between the two articles under discussion.
-the description must present real, attested verb forms
-the description must provide an analysis which makes it possible to generate all verb forms

[6] Inverses are partly discussed in Walther, Jacques and Sagot (2014).

-the description must be user-friendly: it must provide accessible information and explanations, and clear tables, and ideally be accessible to readers beyond specialists of languages of the same geographical area or subgroup. Ideally, it would be possible to make use of the analysis provided in order to develop of pedagogical materials (although of course the description is a linguistic tool, and does not necessarily aim to be "useful" to the speaker community).[7]

As concerns the first element, any description and analysis of a verbal system will inevitably contain a certain amount of abstraction, if for no other reason than that segmentation of some sort will be necessary to describe the system and that parsing a verb form is a necessarily theoretically-influenced activity. It is therefore crucial that real verb forms be presented, to ensure that the abstraction be anchored in the language in question (and the data be verifiable).

The second requirement is important for similar reasons: does the description, despite whatever degree of abstraction it involves, allow the accurate generation of verb forms? If the description provides an analysis of some forms, but does not make it possible to conjugate any given verb of the language in any possible form, then that particular description is only partial and will be less valuable, in an absolute sense, than a description allowing the generation of all possible forms.

The third criterion listed above, user-friendliness, is not a formal criterion in the evaluation of a verbal description, but is nonetheless an important one in terms of the use that can be made of the description in question. In many cases, work on endangered languages involves such a close relationship with the speaker community that it will often lead to the production of materials for revitalization or for pedagogical purposes. For this to be possible, it is helpful when descriptions of the language can be used to prepare such materials.

The following sections will look at the two descriptions of the Khaling verbal system through the lens of these three criteria, in turn, in attempting to determine to what extent the descriptions are successful.

4.1 Real verb forms

The number of actual verb forms presented in Toba's article is relatively limited: infinitive forms and what are labeled 'finite forms' but are in fact 1sg.npst are presented, but no others forms are provided. What is labeled the base form, and used for the derivation of the infinitive and finite verb stems, is in fact an abstraction, but there is no explanation as to how to obtain it. Another significant issue with the Toba data is phonological: vowel length is not marked, nor is tone. While it could be argued that these transcriptions nonetheless constitute real verb forms, in the sense that any transcription of oral data is the result of analysis and no transcription of an utterred form can be said to be more "real" than another (see Ochs 1979), the neutralization of features in the transcription of Khaling verb forms is nonethless problematic: some stems differ only by these features, and the neutralization of these forms--via their identical transcription -- therefore fails to show the possible number of verb stems and their actual realization and distribution.

The Jacques et al description provides an abundance of attested verb forms from Khaling, with a great variety of person/number combinations. In addition the article ends with 114 full verb paradigms, illustrating the various verb types. Additionally, modern methods for description and documentation now rely on recorded audio

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[7] See Bowern (2008: 200) on the difficulties in making a reference grammar which is "community-friendly", despite recent encouragement to do just that.

materials attesting to the actual utterance of forms, and the article was written in conjunction with the preparation of a verb dictionary for which all examples were recorded.
The Jacques et al article does make use of an internally reconstructed root (which is related to Toba's 'base') which is of course not a currently attested verb form but is explicitly stated to be an abstraction: « This reconstructed root has a diachronic reality--it represents, with probably some minor changes due to analogy, the pre-Khaling form of the verb, and it is the form which should be used in comparative work. It is unlikely that this root has a synchronic reality for speakers, but the diachronic perspective greatly simplifies the classification of observed alternations.» (2012: 1105)

4.2 Analysis
The data in Toba 1973 presents a vast oversimplification on many fronts: As far as verb stem alternations are concerned, only three stems are presented for verbs, and these are the base, and the infinitive and finite stems. Section 2 of the present paper presents the stems for the verb 'to kill' as having ten stems, which are listed as *sed*, *sên*, *sets, seç, sê:, sê:t, ses, sêj, se:d.* Even if one were to not take into consideration features such as vowel length and tone (as these are not marked in Toba 1973), and to account for some stem differences as allomorphy, we still need to posit at least five stems[8]: this multiplicity of stems is difficult to reconcile with Toba's 3-stem system. In only considering three stems, Toba has simplified the analysis to the point that it fails to account for or generate the actual language data.
When considering the presentation of personal endings in Toba, the analysis again seems to be based on incomplete data. The only mention of object marking on the verb is a brief sentence ("Agreement between person and number for subject as well as for object is indicated everywhere except third person singular", 1973:3), and this feature of the language does not appear anywhere in the section on personal endings and the paradigm of agreement sufixes. It almost seems as if the page 3 comment may be a last-minute revision to the article prior to publication, based on a reviewer's comments. The ommission of further discussion of object marking is particularly surprising in light of the fact that Grierson and his co-authors were already aware of this feature of languages like Khaling in the early 1900's.
But it is worth questioning whether the table presenting only subject or agent agreement markers is possibly the result of a European view of verb paradigms: if a linguist describing a language has no cognitive slot for object agreement in a paradigm, then perhaps it is not surprising that the feature of the language--although acknowledged in writing in the same article--would not be presented in paradigmatic form. This is particularly true if there is no prior tradition for presenting agent/patient agreement paradigms.
Another issue in the presentation of personal endings is that they are limited to precisely that, namely 'endings'. The 2nd person and inverse relationships in agent-patient are marked prefixally, yet prefixes do not appear in the table of personal endings. The question remains open whether this is because these prefixes had not been identified, or whether the author was not sure how to insert them into a table presenting verb endings.

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[8] The principle behind parsing verb forms into stems and agreement marking is that the maximally recurring material for any given person/number/tense combinations across verbs of all types is taken to be the agreement marking material, and the stem is what is left (for non-compound or otherwise augmented verbs).

These various ommissions in the data result in an analysis which cannot be used to conjugate any given verb in the language: the analysis does not provide a sufficient number of stems nor the conditions for their use, and the ommission of inverse marking and 2nd person indexation means that only a few forms will be able to be generated based on the provided data.
The analysis in Jacques et al is based on a diachronic approach which is made clear from the start: a reconstructed root along with morphophonological rules makes it possible to derive all attested verb forms. The analysis relies on the reconstruction of transitive roots of the shape CVC or CVCt: even though the postfinal -t of the former only surfaces in a few forms in the paradigm, the difference between the two types of verb roots is crucial to explaining differences seen in other forms in the paradigm as well.
The analysis is thus based on a tripartition of verb types--intransitive, transitive and CVCt transitive--as well as on the final consonant of the verb root. With this information in hand, it is possible to map out paradigms for the different verb classes.
Importantly, the model has predictive power: in preparing the article, a gap was noted in the data. There was no verb to illustrate a hypothetical –eŋt verb class. Jacques later found such a verb in the field, and it conjugated according to predictions based on the analysis. This is convincing confirmation that the analysis is a successful one, if it has accurate predictive power for as yet undiscovered verbs.

4.3 User-friendliness
The criterion according to which Toba's description does best is the user-friendliness of the description. This is partly due to the fact that the article is quite short, and the amount of data which is presented is limited, making it easier to handle for the reader. Additional features facilitating usability of the description are in fact based on the oversimplification mentioned earlier.
One of the features that aid in the readability of the description is the tables presenting verb endings. While the presentation is not what we find for European languages[9], the layout is easily interpretable, with cells for different suffixes according to person/number of a single argument and to transitivity (indicated by the labels "agentive" and "non-agentive".)
Another aspect of the presentation that facilitates readability comes about through the oversimplification of data: with only 3 stems posited for any one verb, it is possible to give these forms broad labels which immediately evoke something for the reader. The labels for the verb forms are 'base' (which is unexplicited, but understood to be an elemental form used for derivation), 'infinitive' and 'finite form'. Even though in reality this division is incorrect--and there are many more 'finite' stems than just one--for an uninformed reader, it is simpler to read about 3 stems than 10, especially if the ten cannot be labeled in an immediately transparent way.
These various factors contribute to the Toba description of the verbal system being fairly user-friendly, in the sense that it is not enormously challenging to read. It contains tables of verb agreement markers that do not require training or any particular explicitation in order to process, and the verb stem alternation patterns are limited, in their presentation, to 3 stems, numbers which can be processed. The major problem is that the readability is achieved through an oversimplification of the data: missing tone and vowel length contrasts reduce the number of stems, and some fundamentally important agreement affixes are ignored.

[9] Compare for example the Toba table in 3.1.2 with the presentation of French verb paradigms in school manuals.

The least successful aspect of Jacques et al in terms of the criteria we have laid out for a good verbal description is that it is very challenging to understand. The volume of information contained in the article is very large: it presents 114 distinct verb classes and their different stem distribution patterns (along with complete paradigms).
The morphophonological rules posited for stem alternations are challenging in the way they are presented in Jacques et al. They consist of lists of numbered rules (as in the "Rules" column below), corresponding to different types of stems (as in the "Stem id" column below). Although these rules are described in the article and labeled systematically, there are a great number of them, and the way they are associated in tabular form with stem alternations is opaque; they explain the phenomena accurately but do not facilitate understanding for the average reader.

Table 20: Deriving non-past stems (direct forms) from transitive verb root

Non-past	|set| 'to kill'	|lop| 'to catch'	Stem id., affixes	Rules
1S>3S	sed-u	lob-u	Σ(w,v,b)-u	(1.1) 2.6
1S>3D	sed-usu	lob-usu	Σ(w,v,b)-usu	(1.1) 2.6
1S>3P	sed-unu	lob-unu	Σ(w,v,b)-unu	(1.1) 2.6
1DI>3	sets-i	ləp-i	Σ(w)-i	(1.2) 2.1
1DE>3	sets-u	ləp-u	Σ(w)-u	(1.2) 2.1
1PI>3	seç-ki	loɔp-ki	Σ(s,1p)-ki	(1.4) (2.3/2.4)
1PE>3	seç-kʌ	loɔp-kʌ	Σ(s,1p)-kʌ	(1.4) (2.3/2.4)
2S>3S	ʔi-sē:d-ʉ	ʔi-lē:b-ʉ	ʔi-Σ(w,v,l)-ʉ	1.1 2.1 3.1
2S>3D	ʔi-sê:t-su	ʔi-lê:p-su	ʔi-Σ(w,l)-su	2.1 (3.1/3.2)
2S>3P	ʔi-sê:t-nu	ʔi-lê:p-nu	ʔi-Σ(w,l)-nu	2.1 (3.1/3.2)
2D>3	ʔi-sets-i	ʔi-ləp-i	ʔi-Σ(w)-i	(1.2) 2.1
2P>3	ʔi-sên-ni	ʔi-loɔ̂m-ni	ʔi-Σ(s,a)-ni	(1.5/1.6/1.7/1.10/1.11) (2.3/2.4)
3S>3	sē:d-ʉ	lē:b-ʉ	Σ(w,v,l)-ʉ	(1.1) 2.1 3.1
3D>3	sê:t-su	lê:p-su	Σ(w,l)-su	2.1 (3.1/3.2)
3P>3	sê:t-nu	lê:p-nu	Σ(w,l)-nu	2.1 (3.1/3.2)

The data on agreement markers (in the table reproduced above) also requires familiarity with a particular style of paradigm presentation used for double argument marking as found in Kiranti languages. While the general principles of reading the table are explained (agent person/number in the vertical column, patient person/number in the horizontal row), using the tables can still present difficulties for readers unfamiliar with this type of marking.
One problem which stems from the complex nature of the analysis and presentation in Jacques et al is the difficulty in translating the data into language materials: the article is inaccessible to the Khaling speaker community (and this is acceptable as the intent of the article is to present the verbal system to an academic audience), and care must be taken in preparing materials which include the reconstructed root, which is nonetheless essential to determining the verb class of any given verb.
The result is that the material must be presented in different forms, according to the audience. The Khaling verb dictionary thus exists in two different forms: the *Khaling online verb dictionary* (Jacques, Lahaussois, Rai and Kumar, 2015) is organized according to reconstructed root, whereas a recently published Nepal version (Jacques, Lahaussois, Rai, 2016) is presented according to the infinitive form of the Khaling verb, even if this means that the difference between certain verbs is neutralized in their 'dictionary form'.

Another necessary adaptation for Khaling speakers is the presentation of paradigms. The online (academic) version of the verb dictionary presents paradigms as in the following table. While most linguists familiar with standard glossing practises will be able to interpret the person/number glosses in the left-most column[10], these are opaque to speakers.

Table 11: Transitive verb *ket* 'bite'

	non-past	past	imperative
1S>3S	kɛdu	kɛ̂:tʌ	
1S>3D	kɛdusu	kɛ̂:tʌsu	
1S>3P	kɛdunu	kɛ̂:tʌnu	
1DI>3	kɛtsi	kɛsti	
1DE>3	kɛtsu	kɛstu	
1PI>3	kɛçki	kɛçtiki	
1PE>3	kɛçkʌ	kɛçtʌkʌ	
2S>3S	ʔikɛ̄:dʉ	ʔikɛ̂:tɛ	kɛ̄:de
2S>3D	ʔikɛ̂:tsu	ʔikɛ̂:tɛsu	
2S>3P	ʔikɛ̂:tnu	ʔikɛ̂:tɛnu	
2D>3	ʔikɛtsi	ʔikɛsti	kɛtsije
2N>3	ʔikɛ̂nni	ʔikɛstɛnu	kɛsnuje
3S>3S	kɛ̄:dʉ	kɛ̂:tɛ	
3>3(D)	kɛ̂:tsu	kɛ̂:tɛsu	
3>3(P)	kɛ̂:tnu	kɛ̂:tɛnu	
2/3S>1S	ʔikɛ̂jŋʌ	ʔikɛstʌ	kɛtsʌje
2/3D>1S	ʔikɛ̂jŋʌsu	ʔikɛstʌsu	kɛtsʌsuje
2/3P>1S	ʔikɛ̂jŋʌnu	ʔikɛstʌnu	kɛtsʌnuje
2/3>1DI	ʔikɛtsi	ʔikɛsti	
2/3>1DE	ʔikɛtsu	ʔikɛstu	kɛtsuje
2/3>1PI	ʔikɛçki	ʔikɛçtiki	
2/3>1PE	ʔikɛçkʌ	ʔikɛçtʌkʌ	kɛçkʌje
3,1D/PE>2S	ʔikɛ̂j	ʔikɛstɛ	
3,1D/PE>2D	ʔikɛtsi	ʔikɛsti	
3,1D/PE>2P	ʔikɛ̂nni	ʔikɛstɛnu	
1S>2S	kɛ̂nnɛ	kɛ̂nteni	
1S>2D	kɛ̂nsu	kɛ̂ntensu	
1S>2P	kɛ̂nnu	kɛ̂ntennu	

As a result, the adaptation presents the relevant agent and patient combinations in their pronominal forms, making use of obligatory ergative marking on the agent necessary to signal which pronoun relates to which argument (for example the combination in the top row in the table above would be rendered in devanagari-transcribed Khaling as ʔuŋ-ʌ ʔʌm, which is 1SG-ERG 2PL, indicating a first person singular agent acting on a second person plural patient). The technical terminology and short-hand is therefore bypassed and speakers can make use of the paradigms.

5. Conclusion

The analysis of the verbal descriptions by Toba and Jacques et al reveal that both descriptions are problematic in some ways:

Toba is more accessible, using easily readable paradigms and limiting the number of stems and verb classes, but this comes at the cost of accurate and complete data.

Jacques et al very complete, able to generate and even predict all forms, but is difficult for non-specialists to make use of. The notion of reconstructed root is crucial to analysis, but must be circumvented in pedagogically-oriented materials

Can it be said that one of these descriptions is better than the other? Is the oversimplification in Toba a result of not knowing language well enough or not having a mental framework allowing her to analyze the data in such a way as to generate full conjugational paradigms? Her description predates the practise of laying out of agent/patient paradigms now familiar to all Kiranti specialists, and she was thus producing her description in the absence of a tool making it possible to present the data relatively simply, or possibly, although the Grierson data belies this, to conceive of verbs

[10] The > signifies that what occurs before is the agent and what occurs after is the patient, both being coded by person and number.

with double argument marking. In this light, and considering the problematic data (2nd person prefix not presented, no object marking suffixes, extremely limited number of verb stems, transcription issues without vowel length or tone marked), can the Toba description be called incorrect, or is it more accurate to call it faulty through oversimplification?

Is Jacques et al any better if it has a limited audience? It seems in this case that the answer is yes: Jacques et al is very rich in the data it presents, which makes it difficult for the uninitiated to grasp. Additionally, the analysis is based on the concept of the reconstructed root. Nonetheless, the data presented and the analysis provided are complete and able to make predictions on the behavior of verbs and, barring dialectal variation, can be used to generate any form for any verb in the language.

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