

# ‘Tibetan in digital communication’

Nathan W. Hill and Edward Garrett

(SOAS, University of London)

# Presentation overview

1. Current state of e-resources for Tibetan
2. Current state of e-resources for English
3. 'Tibetan in digital communication'

# Current Tibetan e-resources: OTDO

**OTDO** Home | List of Texts | Search the Texts

 Ignore Case

1530 results found in All Texts.

Sort all lines by Tibetan script order.



Sort by Texts order.



[Pt\\_0016](#) (1)

25v3 pas nI myI gso ba myed do / bod kyI lha btsan po myi rje lhas mdzad pa khrI gtsug lde brtsan gyI zha s

[Pt\\_0126](#) (87)

002 u [---] [dga'?] la // sd[i]g pa ngan - dgu gtong myi phod // tshe cig btsan phyug mchog du 'dzin //  
003 phyug mchog du 'dzin // - lha chos bzang po gcig myi spyod // ma tshor bar du bdud - kyis khyer // g  
004 od // ma tshor bar du bdud - kyis khyer // gna' myi 'dzangs shing che dgu yang // tshe ring da lta -  
005 gs shing che dgu yang // tshe ring da lta - gcig myi snang // shi zin phan cad sa phung yin // myi c  
005 g myi snang // shi zin phan cad sa phung yin // myi cig - skyes pa'i tshe dus la ring por myi thogs d  
006 yin // myi cig - skyes pa'i tshe dus la ring por myi thogs de'u re myed // khrel - dang gzungs myed m  
008 gs myed mna' yang bza' // mtha' ma yun du - legs myi spyod // tshe srog thung ba glog par myur // gs  
010 par 'dre dang srin // gtan kyi grogs ngan skyid myi - myong // dge sdig myi shes nyon re mongs // n  
011 tan kyi grogs ngan skyid myi - myong // dge sdig myi shes nyon re mongs // nang nub myi dal - phyug p  
011 // dge sdig myi shes nyon re mongs // nang nub myi dal - phyug por 'dod // lhag par yod kyang chog

ལྷོ་ལྷོ་ 'person'

... a myi rje lhas m  
- dgu gtong myi phod / / t  
zang po gcig myi spyod / /  
yer / / gna' myi 'dzangs sh  
a lta - gcig myi snang / /  
hung vin / myi cig - skye  
la ring por myi thogs de'u  
un du - legs myi spyod / /

མེ 'not'

lha btsan po **myi** rje lhas m

aga gong **myi** phod / / t

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yer / / **myi** 'dzangs sh

a lta **myi** snang / /

hung yin / / **myi** cig - skye

la ring **myi** thogs de'u

un du **myi** spyod / /

# Similar Problems for English

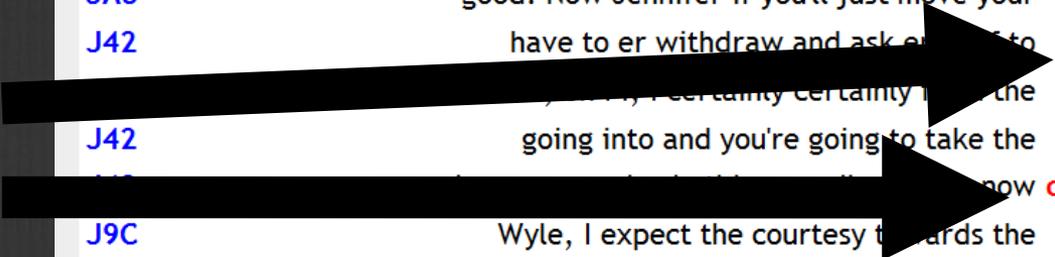
I want 'chair' as a verb.

Corpus: British National Corpus

Hits: 10103 (90.1 per million)

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JA8	you're sitting. If you can't bring your	chair	over. Kendal just bring your chair over
JA8	your chair over. Kendal just bring your	chair	over. Come round and see the board. What
JA8	with you now okay? So can you move your	chairs	so that you can stand up quickly. I think
JA8	good. Now Jennifer if you'll just move your	chair	over to this side. Who's the best one at
J42	have to er withdraw and ask er if to	chair	the meeting. If er if you don't mind. Do
J42	going into and you're going to take the	chair	for this . Well I hope it won't be a is
J9C	Wyle, I expect the courtesy towards the	Chair	, and I am now summing up, so please be
J9C	back there, would you count, please. Eight,	Chair	And against. Six. Seven. Would would you



# Part of speech tagging solves the problem

They are all 'chair' as a verb!

Corpus: British National Corpus

Hits: 1086 (9.7 per million)

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HTK of the new panel, which he was asked to **chair** , and by virtue of his chairmanship he also  
HTK presiding over, and Sir Denis Rooke was **chairing** , what was indeed by far the largest degree  
HTK member of the visiting party, which was **chaired** by Edwin Kerr, reported back to the group  
HTK resolved by the visiting party member who **chaired** the meeting allowing the head of department  
HTK development was an agenda item for this meeting. **Chairing** the Working Party, Edwin Kerr called on  
HGN if this is a meeting, she can bloody well **chair** it. I raise my glass and watch the bubbles  
HGN `</p><p>` `That was the Lord Mayor's nephew **chairing** the panel, you know...' Molly announces,  
HS3 the bottom. A powerful Steering Committee, **chaired** by Rod Turnbull, Managing Director, with  
HBC were represented at the launch which was **chaired** by Wedgwood Group director of human resources  
HBN Education, SCOTVEC and SED and was very ably **chaired** by Mr J Murray, Dean of Technology, Napier

## But it gets even fancier...

- Sketch: typical subjects, objects, modifiers, etc.
- Thesaurus: words with similar meanings

# Sketch

**chair** (*verb*) British National Corpus freq = 1086 (9.7 per million)

<u>object</u>	<u>547</u>	<u>3.8</u>	<u>subject</u>	<u>548</u>	<u>7.0</u>	<u>and/or</u>	<u>17</u>	<u>0.1</u>
sub-committee	<u>5</u>	6.51	Alvey	<u>3</u>	7.3	convene	<u>3</u>	6.59
meeting	<u>100</u>	6.42	Carrington	<u>5</u>	7.14	arrange	<u>3</u>	3.1
committee	<u>106</u>	6.21	Sinclair	<u>3</u>	6.4	<b><u>part intrans</u> <u>4</u> <u>0.3</u></b>		
seminar	<u>6</u>	5.7	Fraser	<u>4</u>	5.8	by	<u>4</u>	5.54
panel	<u>13</u>	5.47	Yeltsin	<u>3</u>	5.1	<b><u>unary rels</u></b>		
session	<u>17</u>	5.45	judge	<u>11</u>	4.96	passive	<u>450</u>	10.5
inquiry	<u>8</u>	4.96	Russia	<u>3</u>	4.07	<b><u>pp_by-p</u> <u>461</u> <u>42.3</u></b>		
commission	<u>19</u>	4.8	president	<u>7</u>	3.54	Alvey	<u>3</u>	7.52
enquiry	<u>5</u>	4.73	minister	<u>15</u>	3.05	Carrington	<u>5</u>	7.25
forum	<u>3</u>	4.55	secretary	<u>7</u>	2.8	Sinclair	<u>3</u>	6.52
tribunal	<u>3</u>	4.45	leader	<u>4</u>	1.93	Yeltsin	<u>3</u>	5.15
conference	<u>15</u>	4.44	person	<u>5</u>	1.73	judge	<u>8</u>	4.51
debate	<u>8</u>	4.18	director	<u>3</u>	1.6	Russia	<u>3</u>	4.09
board	<u>12</u>	3.57	manager	<u>3</u>	1.25	president	<u>8</u>	3.74
talk	<u>6</u>	3.55	member	<u>6</u>	1.2			
cabinet	<u>3</u>	3.2	friend	<u>4</u>	1.16			

# Thesaurus

## chair

British National Corpus freq = 1086

Lemma	Score	Freq
<a href="#">convene</a>	0.108	528
<a href="#">attend</a>	0.102	8993
<a href="#">host</a>	0.088	1096
<a href="#">conclude</a>	0.085	5552
<a href="#">adjourn</a>	0.081	722
<a href="#">organize</a>	0.078	3366
<a href="#">initiate</a>	0.076	2064
<a href="#">conduct</a>	0.074	5099
<a href="#">schedule</a>	0.073	1602
<a href="#">approve</a>	0.073	5241
<a href="#">address</a>	0.071	6025
<a href="#">head</a>	0.069	5885
<a href="#">propose</a>	0.069	7341

## and fancier still...

- Comparing the profile of different words
- Suggestions of example sentences
- Comparing usage across region, time period, genre
- Automatic translation
- Speech recognition
- ... and on and on ...

**Can we do anything like this for Tibetan?**

**Can we do anything like this for Tibetan?**

Not yet, but we are working on it.



# Tibetan in Digital Communication

## Goals

1. 1,000,000 word part-of-speech tagged corpus of Tibetan texts
2. An automatic word breaker
3. An automatic part-of-speech tagger

Tibetan Word Breaking  
and  
Part of Speech Categories

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Part 1

Word Breaking

## Section overview

1. The phonological word
2. The syntactic word

# The Phonological Word

## 1. Phonotactics

- Complex onset normally only in first syllable of two syllable words

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## 2. The domain of *sandhi*

- Case markers, converbs, clitics, are part of preceding word
- *rgyal-pos, rgyal-por*
- *khyod-kyis*
- *ri-rab-bas-kyan mtho* ‘higher even than Mount Meru’

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## 3. The domain of tone (in modern languages)

- One tone assigned to each lexical noun
- One tone assigned to each verb phrase

# The syntactic word

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  - *lus-ñag-sems gsum* ‘the three, body speech, and mind’
  - *khañ-źin-gser-g.yu mdzo-rta gnag-lug* ‘house, fields, gold, turquoise, dzo, horses, yaks, sheep’

# Compounds

- Two nouns in succession are understood as a compound;  
*dandva* like *pha-ma* 'parents' (*pha* 'father' and *ma* 'mother')  
*tatpuruṣa* like *khyim-bdag* 'householder' (*khyim* 'home' and *bdag* 'lord')

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- When an adjective precedes its head this is also treated as a compound.  
*dug btsan-po* 'mighty poison'  
*btsan-dug* 'mighty poison'

## Apposition

- Only case two nouns allowed to sit next to each other.

*bu khyeḥu* ‘a child, a son’

- Proper nouns require this treatment of apposition.

*rgyal-po Gsal-rgyal gyi* ‘King Prasenajit’

*btsun-mo chen-po Ḥbar-li* ‘Ḥbar-li, the main queen’

## Part 2

# Part of Speech Categories

## Parts of speech

- adj
- adv.dir
- adv.intense
- adv.mim
- adv.proclausal
- adv.quant
- adv.temp
- case.abl
- case.agn
- case.all
- case.ass
- case.comp
- case.ela

## POS Categories

1. Adjectives [adj]
2. Adverbs [adv.xxx]
3. Case markers [case.xxx]
4. Clitics [cl.xxx]
5. Converbs [cv.xxx]
6. Demonstratives, determiners, etc. [d.xxx]
7. Nouns [n.xxx]
8. Negation [neg]
9. Numbers [num.xxx]
10. Pronouns [p.xxx]
11. Verbs [v.xxx] and verbal nouns [n.v.xxx]

## Section overview

1. The noun phrase
2. The verb phrase
3. Others

# The Noun Phrase

1. Nouns [n.xxx]
2. Pronouns [p.xxx]
3. Numbers [num.xxx]
4. Adjectives [adj]
5. Determiners and demonstratives [d.xxx]
6. Case markers [case.xxx]

## The Noun Phrase: Nouns [n.xxx]

1. Count nouns [n.count]
2. Mass nouns [n.mass]
3. Proper nouns [n.prop]
4. Relator nouns [n.rel]

## Words

- ཚོས་
- མི་
- ལུས་
- སེམས་
- དུས་
- ལུ་
- སངས་རྒྱས་
- ལྷ་མ
- བཀའ་
- རྒྱལ་པོ་
- བཅོམ་ལྷན་འདས་
- ཡིད་
- རྒྱལ་པོ་

## Count Nouns [n.count]

- Word can head a noun phrase.
- Dictionary meaning (i.e. gut feeling)
- (when possible) nominal suffixes *-mo*, *-po*, *-bu* etc.
- Only in special circumstances can a noun contain case and converbial morphemes.

*gañ-na-ba* 'whereabouts'

*bdag-gi-ba* 'that which is mine'

*kun-tu-rgyu* 'parivrājaka'

*rten-ciñ-ḥbrel-bar-ḥbyuñ-ba* 'pratītyasamutpāda', etc.

## Words

- རིན་པོ་ཆེ་
- གསེར་
- རོར་
- ཚུ་
- སེར་བ་
- ཚང་
- རོར་བུ་
- དུལ་
- ཉམ་
- ཚུ་
- རིན་པོ་ཆེ་
- གསེར་གཡུ་
- ཏུར་སྒྲིག་
- བརྒྱ་རྒྱ་ག་

## Mass Nouns [n.mass]

1. When two nouns not in apposition would follow each other  
*nor-bu sbar gañ* 'a handful of jewels'  
*chu sñim-pa gañ* 'a handful of water'  
*nas khal ñer gcig* 'twenty one loads of barley'
2. Knowing that there exists this syntactic difference, we tag all plausible mass nouns on the basis of their meaning (e.g. *zangs* 'copper').
3. A final list of mass nouns can only be securely put forward after the syntactic behavior of these words is better investigated.

## Words

- མཐུ་ཆེན་
- མར་པ་
- ལྷ་མོ་
- ཀུན་དགའ་པོ་
- མར་པ་
- བརྒྱ་བྱིན་
- རྒྱལ་བྱེད་
- བདག་མེད་མ་
- མགོན་མེད་ཟས་རྒྱུན་
- རྒྱ་གར་
- ཀུན་དགའ་པོ་
- རྒྱ་གར་
- རྒྱ་གར་
- གཞུགས་ཅན་སྤྱིང་པོ་
- བློ་པ་དགའ་

## Proper Nouns [n.prop]

1. Allowed to be grammatically complex
2. Otherwise not much to say about them





## The Noun Phrase: Pronouns

1. Indefinite pronouns [p.indef]
2. Interrogative pronouns [p.interrog]
3. Personal pronouns [p.pers]
4. Reflexive pronouns [p.refl]

## Words

- མ་མོ་
- ལ་ལ་
- མ་མོ་
- ལ་
- མ་མོ་
- མོ་
- ལ་ལ་
- མ་
- མོ་མོ་

## Indefinite Pronouns [p.indef]

- Expressions of indefinite quantity when used as pronouns.
  - *kha* as in *kha cig* ‘some’



## Words

- ལྱོད་
- བདག་
- ང་
- ང
- ལྱོད་
- བདག་ཅག་
- ངོད་
- ལོང་
- ལོ
- མང་མེ
- ལོ་བོ
- ལོ་བོ
- ལོ
- ལོ་ལོ
- ལོ

## Personal Pronouns [p.pers]

No distinction is drawn in person or number.

## Words

- རང་
- བདག་
- རང་

## Reflexive Pronouns [p.refl]

# Numbers [num.xxx]

- Cardinal numbers [num.card]
- Ordinal numbers [num.ord]

◦ (-)num.card

## Words

- གཅིག་
- གཉིས་
- གསུམ་
- བཅུ་
- ལ་
- བཞི་
- བཅུ་
- ལྔ་

◦ (-)num.ord

## Words

- དང་པོ་
- དང་པོ་
- བཞི་པ་
- གཉིས་པ་
- གསུམ་པ་
- གསུམ་པ་
- གཉིས་པ་
- ལྔ་པ་



# The Noun Phrase: Demonstratives, Determiners, etc.

1. Demonstratives [d.dem]
2. Determinates [d.det]
3. Emphatics [d.emph]
4. Indefinites [d.indef]
5. Plurals [d.plural]

## Words

- ལྟོ
- ལྟོ་ལྟོ
- ལྟོ་ལྟོ་ལྟོ

## Demonstratives [d.dem]

## Words

- གཞན་
- རང་
- ཀ་
- འབྲེལ་
- མོགས་
- མེ་
- མེ་
- ཀ་
- བ་སྐྱུག་
- བ་
- ཡ་རེ་
- བས་དག་
- མོགས་
- རྩ་རེ་

## Determiners [d.det]

## Indefinites [d.indef]

Used only for *-cig* and its allomorphs

### Words

- ལྲིག་
- ཨྲིག་
- ཤྲིག་
- ལྲིག་
- ཨྲིག་
- ལྲིག་
- ཤྲིག་

# Plurals [d.plural]

## Words

- རྣམས་
- ཀྱུན་
- དག་
- ཐམས་ཅད་
- ལྷ་ཚོགས་
- འགའ་
- ཡོངས་
- མོ་
- མོ་
- རྒྱུ་ཅད་
- རྒྱུ་
- རྣམས་

# The Noun Phrase: Case markers [case.xxx]

Form	Name	POS tag
<i>-kyi, -gyi, -gi, -yi, -hi</i>	genitive	[case.gen]
<i>-kyis, -gyis, -gis, -yis, -s</i>	agentive	[case.gen]
<i>-la</i>	allative	[case.all]
<i>-na</i>	locative	[case.loc]
<i>-du, -tu, -su, -ru, -r</i>	terminative	[case.term]
<i>-las</i>	ablative	[case.abl]
<i>-nas</i>	elative	[case.ela]
<i>-dan</i>	associative	[case.ass]
<i>-bas</i>	comparative	[case.comp]
<i>-na-re</i>	quotative	[case.nare]

# The Verb Phrase

1. Finite verbs [v.xxx]
2. Verbal nouns [n.v.xxx]
3. Negation [neg]
4. Converbs [cv.xxx]

# The Verb Phrase: Finite verbs

- v.aux
- v.cop
- v.cop.neg
- v.fut
- v.fut.v.past
- v.fut.v.pres
- v.imp
- v.invar
- v.neg
- v.past
- v.past.v.fut
- v.past.v.pres
- v.pres

Apparent from the four stems we distinguish

1. Auxilliarities [v.aux]
2. Copulas [v.cop]
3. Negative verbs [v.neg]
4. Negattive copulas [v.cop.neg]

## Auxilliary verbs

- A verb that occurs immediately after a verb stem
- Normally has a modal meaning
- Does not distinguish four stems
- We do not specifically tag the evidential auxiliaries of Middle Tibetan and Modern Tibetan.

- བཀའ་
- དགོས་
- ལྟུང་
- མོད་
- དགོས་
- འདོད་
- ཤེས་
- ཤེས་
- མོད་
- རྩ་
- གཤམ་
- བའ་
- ལྟུང་
- མོད་
- ལྟུང་
- རྩ་

## Copulas and negative verbs

- Copulas are verbs that identify two absolutive noun phrases
- The only negative verb is *med*
- The only negative copula is *min*

◦ (-)v.cop

Words

- ཡིན་
- ལགས་
- ཡིན
- ལགས

◦ (-)v.cop.neg

Words

- མིན་
- མིན

◦ (-)v.neg

Words

- མེད་
- མེད

# The Verb Phrase: Verbal nouns

- n.v.aux
- n.v.cop
- n.v.fut
- n.v.fut.n.v.past
- n.v.fut.n.v.pres
- n.v.imp
- n.v.invar
- n.v.neg
- n.v.past
- n.v.past.n.v.pres
- n.v.pres

Each finite verb has a corresponding verbal noun.

So far we recognize the following suffixes.

- *-pa/-ba*
- *-rgyu*
- *-thabs*
- *-lugs*
- *-grags*
- *-tshul*
- *-tshad*
- *-mkhan*
- *-sa*

## The Verb Phrase: Negation

### Words

- མ་
- མེ
- མེ་
- མེ་

- With some reservation with put the preverbal morphemes *e* and *ye* here as well as the expected *ma* and *mi*.
- In particular this is a problem for *ye* because it often precedes negation.
  - *chos ye mi yon-ba* ‘no dharma at all has come’

## The Verb Phrase: Converbs [cv.xxx]

Form	Name	POS tag
<i>-kyi, -gyi, -gi, -yi, -hi</i>	genitive	[cv.gen]
<i>-kyis, -gyis, -gis, -yis, -s</i>	agentive	[cv.gen]
<i>-la</i>	allative	[cv.all]
<i>-na</i>	locative	[cv.loc]
<i>-du, -tu, -su, -ru, -r</i>	terminative	[cv.term]
<i>-las</i>	ablative	[cv.abl]
<i>-nas</i>	elative	[cv.ela]
<i>-dan</i>	associative	[cv.ass]
<i>-te, -ste, -de</i>	semi-final	[cv.sem]
<i>-ho, -to, etc.</i>	final	[cv.fin]
<i>-ciñ, -síñ, žiñ</i>	imperfective	[cv.impf]
<i>-cig, -síg, žig</i>	imperative	[cv.imp]
<i>-gin, -gyin, -kyin,</i>	connecting	[cv.cont]

## Other POS tags

1. Adverbs
2. Clitics
3. Dunno
4. Skt

## Others: Adverbs

A sort of catch all for things we are not sure how to deal with.

1. Directional adverbs [adv.dir]
2. Intensive adverbs [adv.intense]
3. Mimetic adverbs [adv.mim]
4. Proclausal adverbs [adv.proclausal]
5. Temporal adverbs [adv.temp]

## Directional adverbs [adv.dir]

### Words

- ཕྱིན་ཅད་
- ཡན་ཚུན་
- ཚུན་ཅད་
- རྒྱུན་ཅད་
- ལྷན་ཅད་
- ལྷན་ཆད་
- ཚུན་
- ཡན་
- ཡན་ཅད་

- A category invented for adverbs that end in *-cad*, to which we have added a few similar words along the way.

## Intensive adverbs [adv.intense]

### Words

- ཤེན་
- རབ་
- ཉ་ཅང་
- ལྷན་ཉེ
- ཅུང་ཟད་

- Used for words that mean ‘very’
- We take *śin* and *rab* as probably etymologically verbs (cf. *mañ du* ‘muchly’), so understand the *-tu* as [cv.term]
- We put *cuñ zad* here also, when it functions adverbially

## Mimetic adverbs [adv.mim]

### Words

- ཁོར་ཁོར་ཡུག་
- ཅར་ཅར་
- ཅབ་ཅོབ་
- ཚྱུག་ཚྱུག་
- ཁོར་ཁོར་ཡུག་
- ཁྲོ་ལོག་ལོག་
- གཅར་རེ་
- ཅར་
- ཏབ་ཏོབ་
- ཏུར་ཏུར་པོ་
- རིག་རིག་
- ལིང་
- རྩིག་རྩིག་

- A category for ideophones, onomatopoeia, and the like.

## Proclausal adverbs [adv.proclausal]

- དེ
- ལང་
- གཞན་
- འོ
- དེ་བ
- འོན་
- ལྟར་པ
- ལ

- Things that begin clauses and generally refer back adverbially to a previous clause.
- The second element is treated as it normally would be.

*de* [adv.proclausal] *nas* [case.ela] ‘then’

*yañ na* [case.loc] ‘alternatively’

*gal te* [cv.sem] ‘if’

*ho na* [case.loc] ‘in that case’

*de-ba s* [case.agn] ‘therefore’

*hon kyañ* [cl.focus] ‘nonetheless’

*khyad-pa r* [case.term] ‘in particular’

*la r* ‘moreover’

## Words

- ད་
- ལྷན་
- ད་དུང་
- ལ
- ལྷི་ཉིན་
- ལ་མང་
- ཉང་པ
- དང་
- གདོད་
- ཉིན་
- ལུམ་
- གཞོན་
- མདང་

## Temporal adverbs [adv.temp]

- Used for time expressions ‘now’, ‘today’, ‘previously’, etc.
- Often these words appear in nominal contexts, *sañ gi gdugs la* ‘yesterday midday’
- But they can also occur as adverbial adjuncts without casemarking.

## Others: Clitics

We use this tag for things that occur in places where nothing else appears to.

1. Focus clitics [cl.focus]
2. The clitic *lta* [cl.lta]
3. The quotative clitic [cl.quot]

## Focus clitics [cl.focus]

- A category for *ni* and *kyañ* ~ *yañ*
- These words occur after anything
- They occur even after case marking  
(i.e those who see *ni* as some kind of case marker are not paying enough attention)

### Words

- ཡང་
- ལྟར་
- ལྟེ་
- རྟེ་
- ལྟེ་
- ཅང་
- ལྟེ་ཡང་
- ཡང་

## Clitic *lta* [cl.lta]

- For some strange uses of *lta*

### Words

- ལྟ
- དག
- ལྟ

... *gyur na lta*

... *sdug-bsñal rnams myoñ-bar hoñ-ba lta /*

*ziñ-khañ gi phyogs la ḡgro-ba dag e cañ che ste*

(For *dag* in Mila other recensions have *lta*)

## The quotative clitic [cl.quot]

### Words

- विस
- उव
- सुव
- व
- सुव
- विस
- उ
- उव
- उव
- विस

- For *ces* and *ces-pa* and its allomorphs
- We now think it would be better to treat these as part of a new class of *verba dicendi* that take clauses as complements (cf. *zer*, *sñam*, etc.) but it is too late.

(inclusion of *sñam* at left is an error)