

Beyond the segment

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What am I trying to show?

- ▶ We are dealing with discrete units, but they are nothing like segments.
- ▶ Notion *segment* is an impediment to the understanding of certain phonological phenomena (here: length in English & Estonian).
- ▶ Phonological differences do not have to be located in one particular point (contra the phonemic view).
- ▶ Notion *phoneme*, one particular type of segment, and the accompanying notions of *phonemic vs. allophonic* make it impossible to see the clear parallels between Estonian and English.
- ▶ Non-segmental view of phonology: Further development of Government Phonology, GP, (Kaye, Lowenstamm & Vergnaud 1985, 1990; Kaye 1990, 1995; Charette 1990, 1991), sometimes referred to as GP 2.0 (Kaye & Pöchtrager 2010; Pöchtrager 2006, 2009b,a,c, 2010; Živanovič & Pöchtrager 2010).

Nihil novum sub sole?

- ▶ Phoneme brought down long ago, *cf.* Hamp (1951); Halle (1959); Chomsky (1964); Chomsky & Halle (1968); Postal (1968); Anderson (1974); Sommerstein (1977).
- ▶ Segment discredited in Autosegmental Phonology (“Unique slicing hypothesis”), *cf.* Goldsmith (1976).
- ▶ That debate has never been brought to bear on the problem to be discussed here, *i. e.* length in English & Estonian.

Binary length distinctions

▶ English: *bit/beat, full/fool* etc.

▶ Italian: complementary length

<i>fatto</i>	'fat:ɔ	'done'	<i>cassa</i>	'kas:ɪ	'cash desk'	○	●	●
<i>fato</i>	'fa:tɔ	'fate'	<i>casa</i>	'ka:zɐ	'house'	○	○	●

Estonian

- ▶ Bye (1997); Hint (1973, 1998); Lehiste (1960, 1965); Ojamaa (1976); Posti (1950); Prince (1980); Tauli (1973) etc.

- ▶ Monosyllabic words

<i>kepp</i>	geb::	'stick'	<i>jutt</i>	jud::	'story'	○	●	●	●
<i>keep</i>	ge:b:	'cape'	<i>kiit</i>	gi:d:	'praise'	○	○	●	●
<i>keeb</i>	ge::b	'(it) boils'	<i>siid</i>	si::d	'silk'	○	○	○	●

- ▶ Bisyllabic words

	consonants		vowels	
Q1	lina	'linen NOM. SG.'	sada	'hundred NOM. SG.'
Q2	lin:a	'city GEN. SG.'	sɑ:da	'send! IMPER.'
Q3	lin::a	'city PAR. SG.'	sa::da	'to receive INF.'

- ▶ Note: Problematic for phonemic analysis (Ojamaa 1976).

What we are never told about Estonian

	consonants		vowels		
Q1	lina	'linen NOM. SG.'	sada	'hundred NOM. SG.'	
Q2	lin:a	'city GEN. SG.'	sa:da	'send! IMPER.'	②
Q3	lin::a	'city PAR. SG.'	sa::da	'to receive INF.'	①

- ▶ Q3 in bisyllabic words (①): *always* morphologically complex,
- ▶ Q2 in bisyllabic words (②): not necessarily morphologically complex.
- ▶ A more accurate rendering of the chart reveals further differences:

	consonants		vowels		
Q1	linaˑ	'linen NOM. SG.'	sadaˑ	'hundred NOM. SG.'	⇐
Q2	lin:aˑ	'city GEN. SG.'	sa:daˑ	'send! IMPER.'	⇐
Q3	lin::a	'city PAR. SG.'	sa::da	'to receive INF.'	

What to make of this?

- ▶ Phonemic/segmental approaches: Estonian problematic, no insightful analysis emerges.
- ▶ Estonian (with possibly three degrees of length) looks *very* different from most other languages.
- ▶ Most analyses try to reduce the ternary distinction to two independent parameters (e.g. length coupled with a special accent), but they overgenerate: We should get $2 \times 2 = 4$ logical possibilities.

The result we will end up with in this talk:

- ▶ Three degrees of length nothing exotic, but more common than usually assumed.
- ▶ English and Estonian are in large parts identical.

Principle of Non-Arbitrariness (NAP)

At the heart of Government Phonology:

“There is a direct relation between a phonological process and the context in which it occurs.” (Kaye, Lowenstamm & Vergnaud 1990: 194)

Length in English monosyllables

ADDITIONAL LENGTH		FINAL CONSONANT	NO ADDITIONAL LENGTH		FINAL CONSONANT
<i>bid</i>	bi:d	({ ? } <u>A</u>)	<i>bit</i>	bit	({ H, ? } <u>A</u>)
<i>bead</i>	bi:d	({ ? } <u>A</u>)	<i>beat</i>	bi:t	({ H, ? } <u>A</u>)
<i>big</i>	bi:g	({ ? } <u> </u>)	<i>sick</i>	sɪk	({ H, ? } <u> </u>)
<i>league</i>	li:g	({ ? } <u> </u>)	<i>beak</i>	bi:k	({ H, ? } <u> </u>)
<i>rib</i>	ri:b	({ ? } <u>U</u>)	<i>rip</i>	ri:p	({ H, ? } <u>U</u>)
<i>lube</i>	lu:b	({ ? } <u>U</u>)	<i>loop</i>	lu:p	({ H, ? } <u>U</u>)
<i>bin</i>	bi:n	({ L, ? } <u>A</u>)	—		
<i>bean</i>	bi:n	({ L, ? } <u>A</u>)	—		
<i>dim</i>	di:m	({ L, ? } <u>U</u>)	—		
<i>deem</i>	di:m	({ L, ? } <u>U</u>)	—		
<i>bill</i>	bi:l	({ A } <u> </u>)	—		
<i>peel</i>	pi:l	({ A } <u> </u>)	—		
<i>live</i>	li:v	({ } <u>U</u>)	<i>stiff</i>	sti:f	({ H } <u>U</u>)
<i>leave</i>	li:v	({ } <u>U</u>)	<i>leaf</i>	li:f	({ H } <u>U</u>)
<i>his</i>	hi:z	({ } <u>A</u>)	<i>hiss</i>	hi:s	({ H } <u>A</u>)
<i>(to) use</i>	ju:z	({ } <u>A</u>)	<i>(a) use</i>	ju:s	({ H } <u>A</u>)

Length in English monosyllables (detail)

ADDITIONAL LENGTH	FINAL CONSONANT	NO ADDITIONAL LENGTH	FINAL CONSONANT
<i>bid</i>	bɪ:d	({ <u>?</u> } <u>A</u>)	
<i>bead</i>	bi::d	({ <u>?</u> } <u>A</u>)	
		<i>bit</i>	bɪt
		<i>beat</i>	bi:t
			({ <u>H</u> , <u>?</u> } <u>A</u>)
			({ <u>H</u> , <u>?</u> } <u>A</u>)

- ▶ English actually distinguishes *bid*, *bit*, *bead*, *beat*.
- ▶ (American) English: Correlation of length and the nature of the following consonant, cf. Peterson & Lehiste (1960); Zue & Laferriere (1979) etc.
- ▶ **Observation:** Additional length if the vowel is not immediately followed by a phonological expression containing **H** (left column).
- ▶ (**H** ~ voicelessness.)

A problem for Non-Arbitrariness

“Additional length if the vowel is not immediately followed by a phonological expression containing **H**.”



Violates Non-Arbitrariness:

1. Melody seems to interact with structure.
2. No relation between absence of **H** and (additional) length.
3. Why **H** of all elements, why not any other?

Fortis/Lenis-Hypothesis (Pöchtrager 2006)

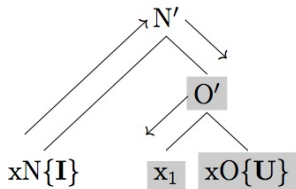
- ▶ **H** not an element, but a particular structural configuration. **H** is length.
- ▶ *bid/bit*: *d* is the “short version” of *t*; analogous *v/f* etc.
- ▶ English monosyllables show a trade-off similar to Italian:

<i>bit</i>	bɪt	<i>whiff</i>	wɪf	○	●	●
<i>bid</i>	bɪd	<i>give</i>	gɪv	○	○	●
- ▶ Similar claims: Ojibwa (Bloomfield 1956), Cuna (Sherzer 1970), Dutch fricatives (van Oostendorp 2003), Austrian German (Kühnhammer 2004).

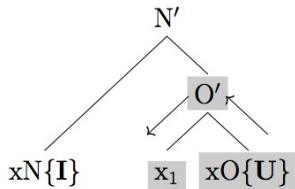
Example representations (relevant detail)

Melody distributed differently (melodic command, **m-command**)

(a.) relevant detail of *give*: v



(b.) relevant detail of *whiff*: f

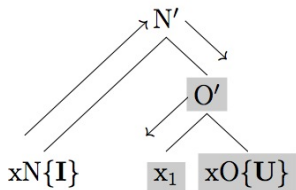


- ▶ In both cases, the fricatives v/f consist of two points, xO and x_1 , projecting into O' (grey).
- ▶ For f (b), both positions are used up by the fricative itself (arrows).
- ▶ For v (a), only the head xO is used up. The unused complement x_1 can be used by the preceding vowel xN (arrows).

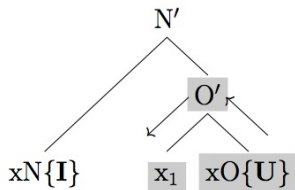
Problem solved

(Repetition of the structures)

(a.) relevant detail of *give*: ɪ:v



(b.) relevant detail of *whiff*: ɪf



Solves our problems with Non-Arbitrariness:

- ▶ Lenis: unused point, used up by preceding vowel: hence lengthening.
- ▶ Special status of old **H** becomes clear: There really is no element **H**, we are dealing with a structural configuration.
- ▶ (Implementation made several changes to GP necessary, for details *cf.* Pöchtrager (2006).)

Parallels (and differences) between Estonian & English

		V				C						
a.	—	Q2	○	○	●	Q1	<i>bid</i>	bi:d				
	—	Q1	○	●	●	Q2	<i>bit</i>	bit				
b.	<i>maa</i> ma:ː	'country'	Q3	○	○	○	—	<i>bee</i>	bi:ː	⇐⇐		
c.	<i>siid</i>	si:ːd	'silk'	Q3	○	○	○	●	Q1	<i>bead</i>	bi:ːd	⇐⇐
	<i>kiit</i>	gi:dː	'praise'	Q2	○	○	●	●	Q2	<i>beat</i>	bi:t	⇐⇐
	<i>jutt</i>	judː	'story'	Q1	○	●	●	●	Q3	—		

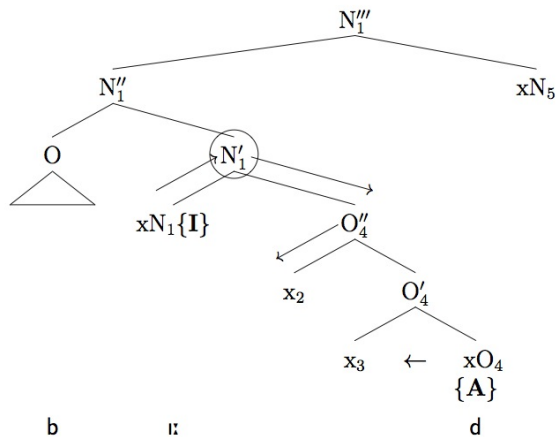
- ▶ *bid/bit* (a) too short for Estonian, possibly correlation with English tense/lax system?
- ▶ *bee* (b): Minimal length requirements also in English.
- ▶ Estonian has geminates, (misleading term), English doesn't (c).
- ▶ Half of the forms have identical representations in both languages.

The lesson

- ▶ Looking at a property that is considered irrelevant in English (“allophonic”) has opened the door to a representational format that can also handle Estonian (“phonemic”).
- ▶ The notion of a *trade-off* is more important than where the difference between two forms is located (contra segmental view).

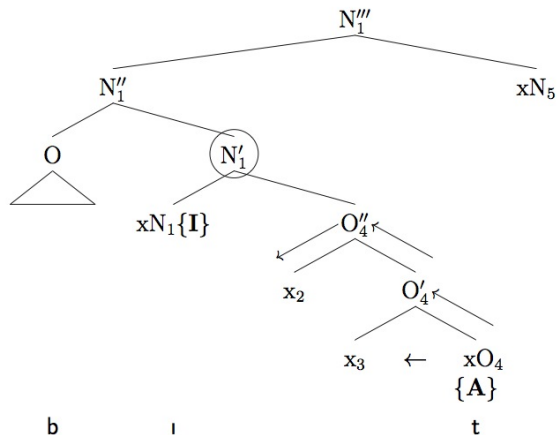
Example representations

English *bid* bɪ:d



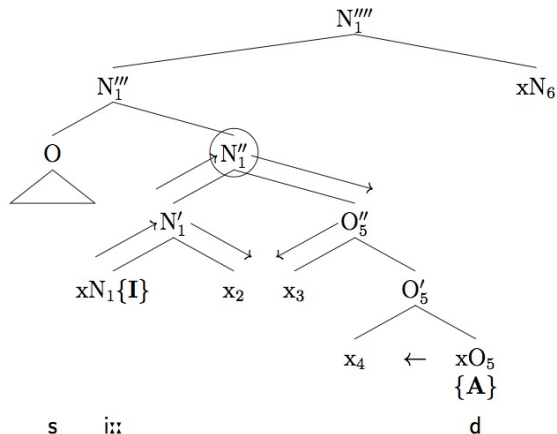
Example representations

English *bit* bit



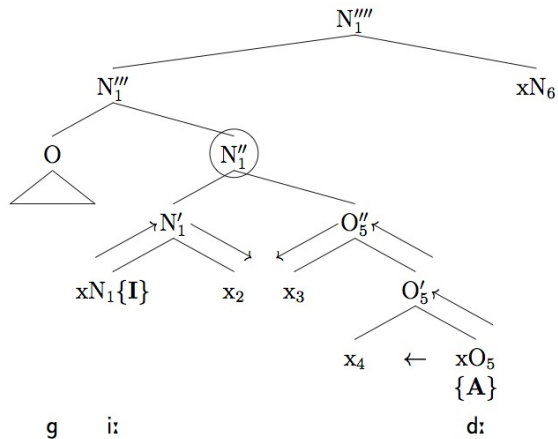
Example representations

Common structure of Estonian *siid* si::d 'silk' and English *bead* bi::d



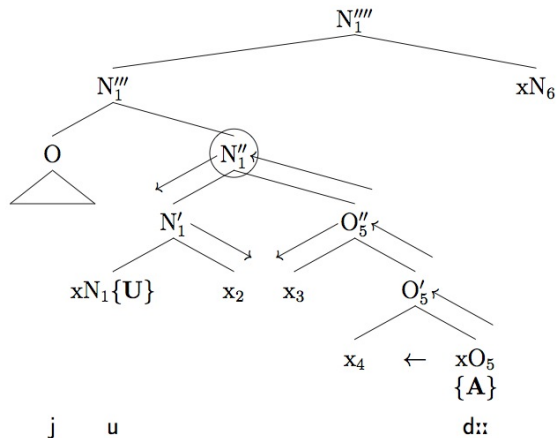
Example representations

Common structure of Estonian *kiit* gi:d: 'praise' and English *beat* bi:t



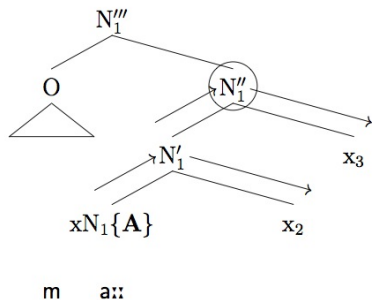
Example representations

Estonian *jutt* jud:: 'story'



Example representations

Common structure of Estonian *maa* ma:: ‘country’ and English *bee* bi::



English bisyllables

- ▶ The **extra position** given by a lenis consonant is **not available if that consonant belongs to the next “syllable”**:

- ▶ i. *rub* rʌ:b *rubber* 'rʌbə
- ii. *men* mɛ:n *many* 'meni
- iii. *leave* li:v *beaver* 'bi:və

- ▶ This is true irrespective of whether morphology is involved or not:

- ▶

i.	<i>tube</i>	tu:b	<i>tuba</i>	'tu:bə	no morph.
ii.	<i>soup</i>	su:p	<i>super</i>	'su:pə	no morph.
iii.	<i>lube</i>	lu:v	<i>lubing</i>	'lu:viŋ	morph.
iv.	<i>loop</i>	lu:p	<i>looping</i>	'lu:piŋ	morph.
v.	<i>seed</i>	si:d	<i>seeding</i>	'si:diŋ	morph.
vi.	<i>seat</i>	sit	<i>seating</i>	'si:tiŋ	morph.

Estonian parallels English yet again

We observe a surprisingly similar effect in Estonian:

- ▶ *siid* si:³d ‘silk’ has a Q3 vowel,
- ▶ its genitive si:²di· *siidi* has a Q2 vowel.
- ▶ But note the additional length of the final vowel (“half-long”, really long but unstressed).

How to make sense of this?

- a. si:d STEM/NOM. SG. ○ ○ (○ ●)
- b. i SUFFIX ⊙
- c. si:di' GEN. SG. ○ ○ (○ ●) ⊙
-

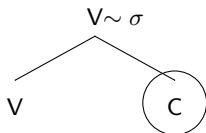
In both languages, the extra room given by a lenis consonant is available **unless the vowel of the following syllable takes precedence.**

- ▶ Stem has Q3 vowel, one point is part of the final consonant.
- ▶ Suffix attached.
- ▶ Vowel of the suffix snatches the point within the stem-final consonant.

Locality

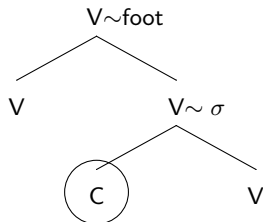
In both languages, the extra room given by a lenis consonant is available **unless the vowel of the following syllable takes precedence.**

a.



m $\epsilon:$ n

b.



m ϵ n i

Where the two languages differ:

1. English: if the unused position in the lenis C is not used by the preceding V , *nobody* can use it.
2. Estonian: if the unused position in the lenis C is not used by the preceding V , the *following* V can use it. (Simplified.)

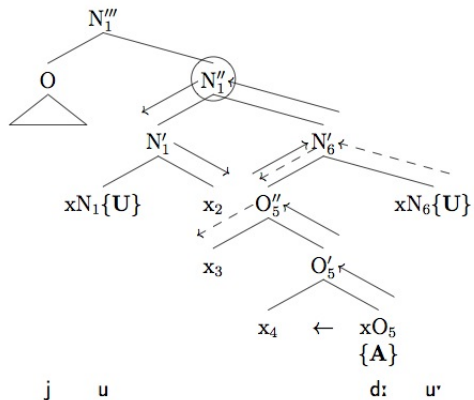
Estonian: Larger pattern, completely regular

	NOM.		GEN.		PAR.		
a.	<i>siid</i>	si::d	<i>siidi</i>	'si:di'	<i>siidi</i>	'si::di	'silk'
b.	<i>kiit</i>	gi:d:	<i>kiidu</i>	'gi:du'	<i>kiitu</i>	'gi:d:u	'praise'
c.	<i>jutt</i>	jud::	<i>jutu</i>	'jud:u'	<i>juttu</i>	'jud::u	'story'

- ▶ Shortenings of consonants in the genitives (Q2 → Q1, Q3 → Q2).
- ▶ Partitive: suffix added but...
 1. no shortening in stem
 2. no extra length of the suffix

Example representations: genitives

Genitive *jutu* jud:u^* (cf. nominative *jutt* jud::)



Morphology and the partitive puzzle

Morphology-phonology interface: Kaye (1995)

- ▶ English NC clusters homorganic (*tent*/**tenp*, *lamp*/**lamk* etc.)
- ▶ Seemingly violated in *seemed*.
- ▶ But: morphologically complex, *seem* plus *-ed*.
- ▶ Nature of cluster (not homorganic) & presence of long vowel (impossible before cluster) in *seemed*: Not one single domain.

Analytic morphology: [[*seem*] *ed*]

- ▶ Contrast: *kept* morphologically complex, but like morphologically simplex for phonology (*cf. apt, adopt*).

Non-analytic morphology: [*kept*]

Relevance for Estonian

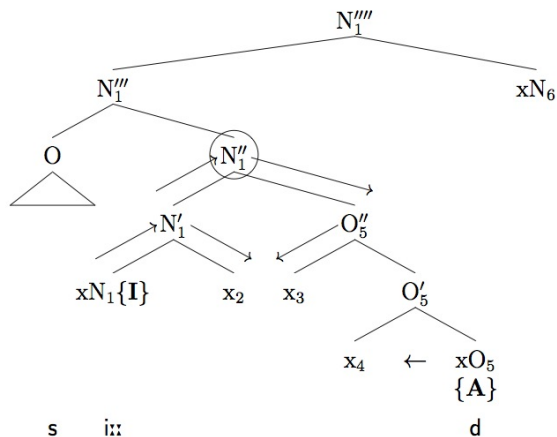
Characterises the contrast between genitive and partitive we saw before:

NOM. SG.	si::d	[si::d]	gi:d:	[gi:d:]	jud::	[jud::]
GEN. SG.	si:di̯	[si:d + i̯]	gi:du̯	[ki:d + u̯]	jud:u̯	[jud: + u̯]
PAR. SG.	si::di	[[si::d]i]	gi:d:u	[[ki:d:]u]	jud::u	[[jud::]u]

- ▶ Genitive: Suffix interacts with stem, non-analytic morphology.
- ▶ Two indications: (i) length alternations in stem, (ii) half length in suffix.
- ▶ Partitive: Suffix does not interact with stem, analytic morphology.
- ▶ Recall one observation made before: Q3 in bisyllabic words always morphologically complex, Q2 in bisyllabic words not necessarily.
- ▶ The same holds true for other examples.

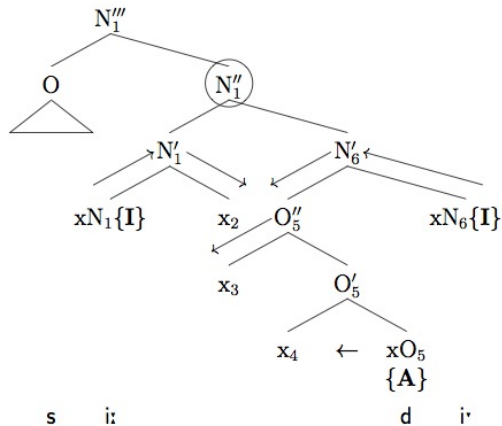
Example representation: nominative, genitive, partitive

Nominative *siid* si::d 'silk'



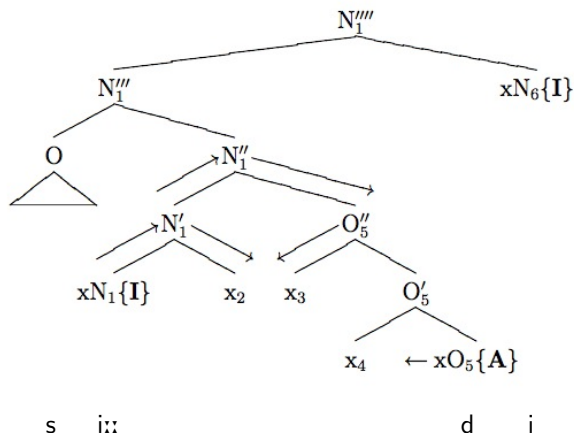
Example representation: nominative, genitive, partitive

Genitive *siidi* si:di· 'silk'



Example representation: nominative, genitive, partitive

Partitive *siidi* si:ɪ:di 'silk'



Predictions

Predicts: no morphology → no Q3.

Loans (no internal morphological structure):

a.	<i>teema</i>	'Thema'	'de:ma'	(Q2)
	<i>floora</i>	'Flora'	'flo:ra'	(Q2)
	<i>draama</i>	'Drama'	'dra:ma'	(Q2)
	<i>liiga</i>	'Liga'	'li:ga'	(Q2)
b.	<i>loto</i>	'Lotto'	'lod:o	(Q2)
	<i>summa</i>	'Summe'	'sum:a	(Q2)
	<i>kassa</i>	'Kasse'	'gas:a	(Q2)
	<i>lasso</i>	'Lasso'	'las:o	(Q2)

Conclusion

If we give up...

- ▶ the idea differences between word forms must be located in one particular point & a segmental view of phonology,
- ▶ the idea that only contrast matters in phonology (which is why people usually don't worry about vowel length in *bid/bit*) and
- ▶ the idea that *d/t* etc. in English differ in terms of melody (elements, features)

... then...

- ▶ we can set up a representational format that brings out the commonalities between English and Estonian (the proverbial “freak of nature”) and
- ▶ we can make one further step towards an understanding of Universal Grammar.

Thank you!
Tänan!

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