

Morphologically conditioned (sub)segmental subtraction in Mam

Myriam Lapierre, Tessa Scott, Karee Garvin
University of California, Berkeley

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Introduction

- Mam presents a pattern of **subtractive morphology**
 - Dependent clause morphemes trigger phonological reduction of the following **absolute clitic**
- Matrix: /**ts**/ > Dependent: /**s**/ (2nd/3rg singular absolutive)
- Matrix /**tʃ**/... > Dependent /**ʃ**/... (1st singular absolutive)
- Matrix /**q**/... > Dependent /**q**/... (1st plural absolutive)

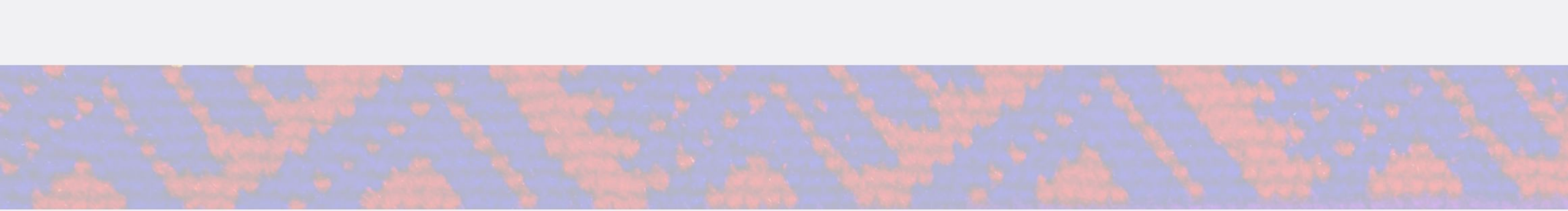
Introduction

Generalization: Iff the triggering morpheme precedes a contour segment, the first *subsegment* is deleted

- This pattern is important because
 1. cases of subtractive morphology are rare, especially at the left edge of a morpheme (Anderson 1992, Trommer & Zimmermann 2014)
 2. it presents evidence that *subsegments* are phonological entities that can be referenced within grammar
- Q-Theory elegantly accounts for the *subsegmental* deletion (Inkelas & Shih 2013, 2016, 2017; Shih & Inkelas 2014, 2019)

Outline

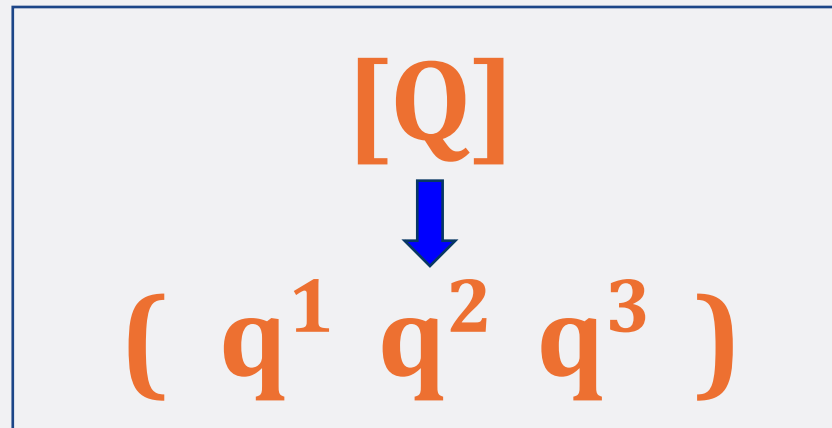
- Introduction
- Q-theory
- Mam Background
- The pattern
 - Absolute Clitic in matrix clause
 - Absolute Clitic in dependent clause
- Subsegmental subtraction analysis
- Conclusion



Q-Theory

Q-Theory

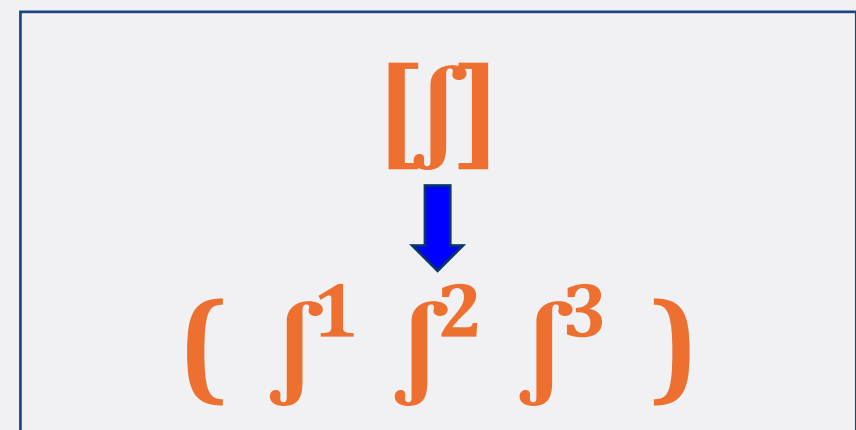
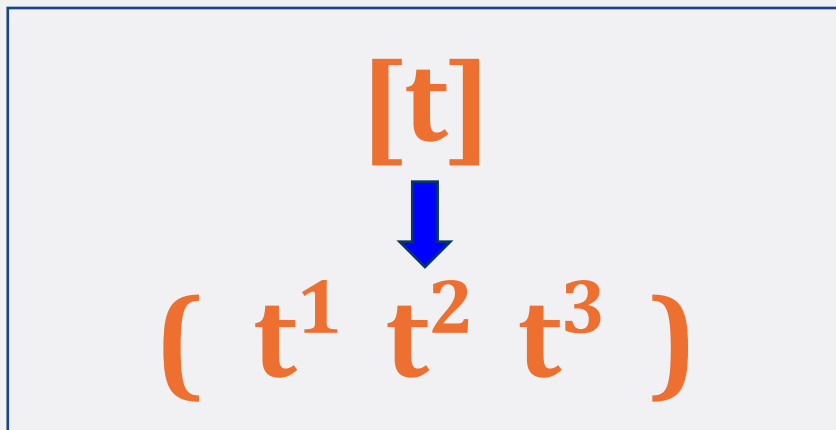
- Q-Theory is a model of representational phonology in which segments [Q] are divided into **three subsegments** ($q^1 q^2 q^3$) (Shih & Inkelas 2019)



- The **target** of a phonological process can be
 - a segment ($[Q] \rightarrow [\emptyset]$) or
 - a **subsegment** ($[q] \rightarrow [\emptyset]$)

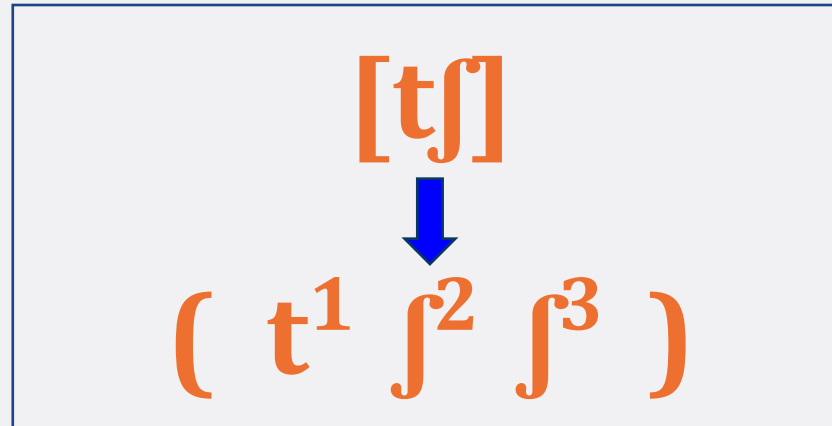
Q-Theory

- Following Landmark Theory_(Gafos 2002) within Articulatory Phonology, the 3 qs roughly correspond to the notions of:
 - onset transition (q^1)
 - target (q^2)
 - onset release (q^3)



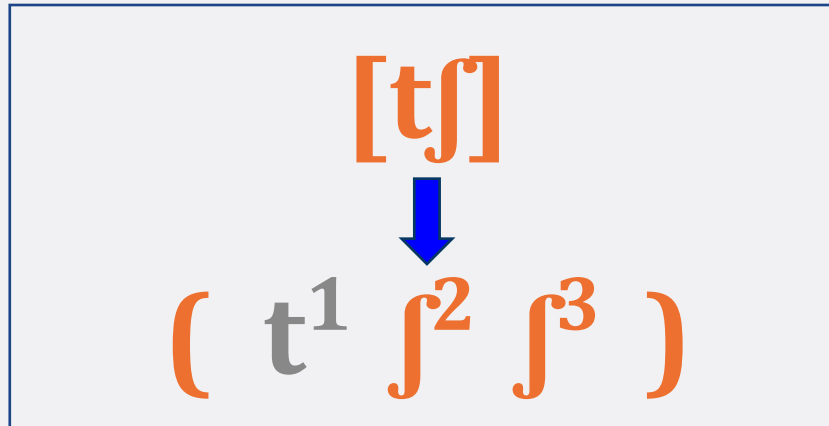
Q-Theory

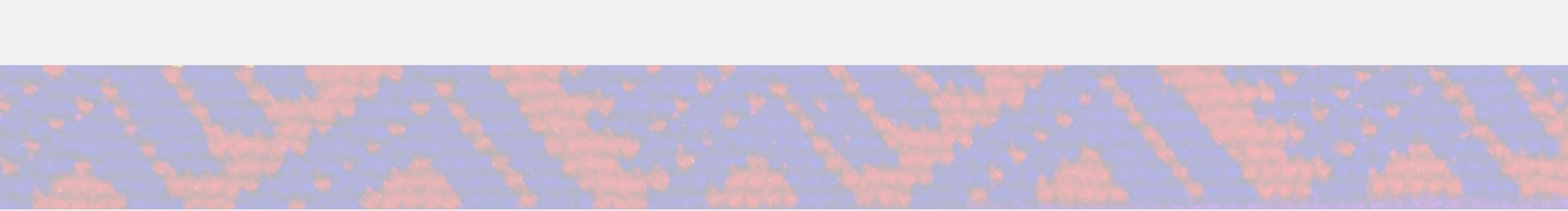
- We analyze the alternation between /tʃ/ and /ʃ/ in Mam as



Q-Theory

- We analyze the alternation between /tʃ/ and /ʃ/ in Mam as **deletion of the first subsegment** of the affricate





Mam Background

Mam Background

- Mayan language
- Approximately 488,000 speakers
(Eberhard, Simons, and Fennig 2019)
- Spoken in the western highlands of Guatemala and the state of Chiapas, Mexico
- The data presented here come from San Juan Atitán Mam
 - same pattern has been noted for Ixtahuacán Mam (England 1983)



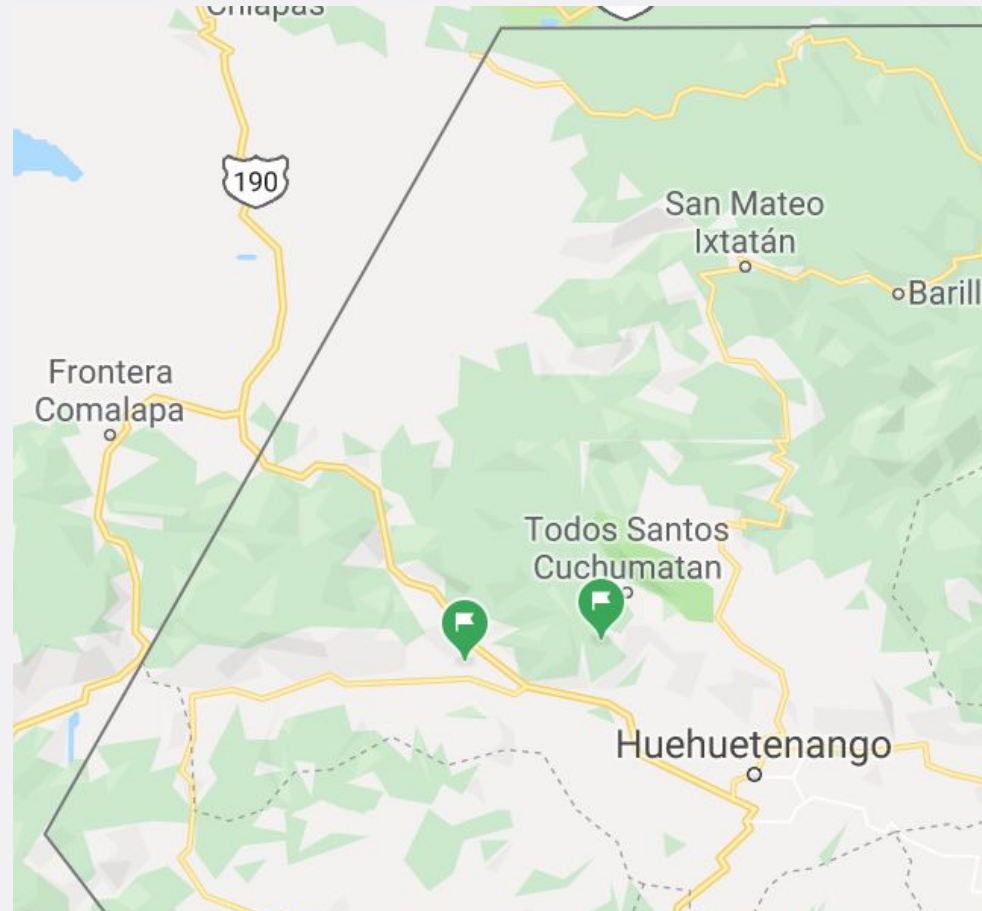
Mam Background

San Ildefonso Ixtahuacán (West) and San Juan Atitán (East)



Mam Background

San Ildefonso Ixtahuacán (West) and San Juan Atitán (East)



30 km apart



The Pattern

Absolutive Clitic in Matrix Clauses

Syntactic environment: matrix clause clitics

Aspect-Clitic-Verb

ma	tʃn=	uli
mat.prox	1sg.abs	arrive

‘I arrived.’

Syntactic environment: matrix clause clitics

- Absolutive clitics have two allomorphs

(1) a) **ma** **tfin** **poni**
mat.prox **1sg.abs** **arrive**
 ‘I arrived (there).’

b) ma tʃn=uli
mat.prox 1sg.abs=arrive
'I arrived (here).'

Syntactic environment: matrix clause clitics

/ __ C

	sg	pl
1st	tsin	qo
2nd	∅	tʃi
3rd	∅	tʃi

/ __ V

	sg	pl
1st	tʃn-	qw-
2nd	ts-	tʃχ-
3rd	ts-	tʃχ-

Syntactic environment: matrix clause clitics

- The realization of absolutive clitics in matrix clauses is the underlying form of the clitic

- (2)
- | | | | | | | | |
|----|-----------------------|---------|--------|----|---------------------------|-----------|-------|
| a) | n=tfin | tsoni | tjan | c) | o | tfin | bişni |
| | imp=1sg.abs | prepare | chan | | mat.perf | 1sg.abs | dance |
| | 'I'm preparing chan.' | | | | 'I danced' | | |
| | | | | | | | |
| b) | ma | tfin | poni | d) | tfin | kşuli i'ş | nex |
| | mat.prox | 1sg.abs | arrive | | 1sg.abs | chew corn | later |
| | 'I arrived.' | | | | 'I will chew corn later.' | | |

Absolutive Clitic: Matrix paradigm

	[tʃn-] 1sg	
/ma/ mat.prox	[ts-] 2/3sg	/ul(i)/ verb
	[qw-] 1pl	
	[tʃχ-] 2/3pl	

Absolutive Clitic: Matrix paradigm

- Morphosyntactic syncretism
 - first/non-first distinction

	[tʃn-] 1sg	
/ma/ mat.prox	[ts-] 2/3sg	/ul(i)/ verb
	[qw-] 1pl	
	[tʃχ-] 2/3pl	

Absolutive Clitic: Matrix paradigm

- Morphosyntactic syncretism
 - first/non-first distinction
 - sg/pl distinction

	[tʃn-] 1sg	
/ma/ mat.prox	[ts-] 2/3sg	/ul(i)/ verb
	[qw-] 1pl	
	[tʃχ-] 2/3pl	

Absolutive Clitic: Matrix paradigm

- Morphosyntactic syncretism
 - first/non-first distinction
- Phonological Form

	[tʃn-] 1sg	
/ma/ mat.prox	[ts-] 2/3sg	/ul(i)/ verb
	[qw-] 1pl	
	[tʃχ-] 2/3pl	

Absolutive Clitic: Matrix paradigm

- Morphosyntactic syncretism
 - first/non-first distinction
- Phonological Form
 - Singulars and 2/3pl start with an affricate

	[tʃn-] 1sg	
/ma/ mat.prox	[ts-] 2/3sg	/ul(i)/ verb
	[qw-] 1pl	
	[tʃχ-] 2/3pl	

Absolutive Clitic: Matrix paradigm

- Morphosyntactic syncretism
 - first/non-first distinction
- Phonological Form
 - Singulars and 2/3pl start with an affricate
 - 1pl starts with stop

	[tʃn-] 1sg	
/ma/ mat.prox	[ts-] 2/3sg	/ul(i)/ verb
	[qw-] 1pl	
	[tʃχ-] 2/3pl	

Absolutive Clitic: Matrix paradigm

- Morphosyntactic syncretism
 - first/non-first distinction
- Phonological Form
 - Singulars and 2/3pl start with an affricate
 - 1pl starts with stop

Crucially, only the **clitics beginning with an affricate** undergo the alternation

/ma/
mat.prox

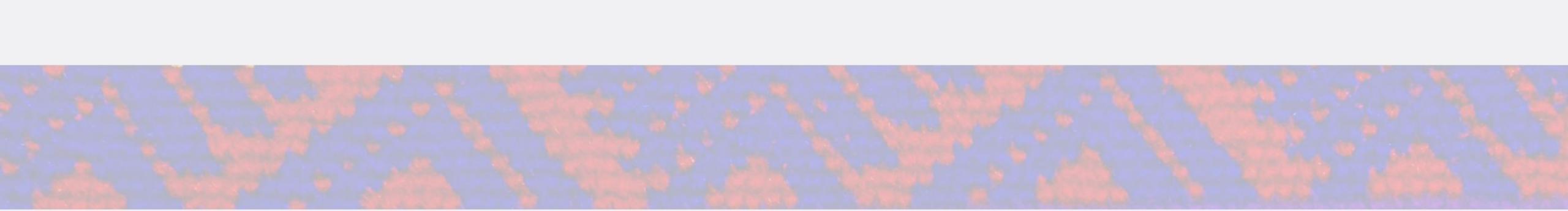
[tʃn-]
1sg

[ts-]
2/3sg

[qw-]
1pl

[tʃχ-]
2/3pl

/ul(i)/
verb



The Pattern

Absolutive Clitic in Dependent Clauses

Syntactic Environment: Dependent

- There are a range of clauses that count as “dependent”
- We’ll show it with a [tax-] ‘when’ clause:

(3) ξ-t-il q'a [tax ξ-qw-ul-i.]
 dep.prox-2/3sg.erg-see boy [when dep.prox-1.pl.abs-arrive-i]
 ‘He saw when we arrived.’

Syntactic Environment: Dependent

- Dependent aspect marking is in the same slot as matrix aspect marking

Aspect-Clitic-Verb

§-

qw-

uli

dep.prox

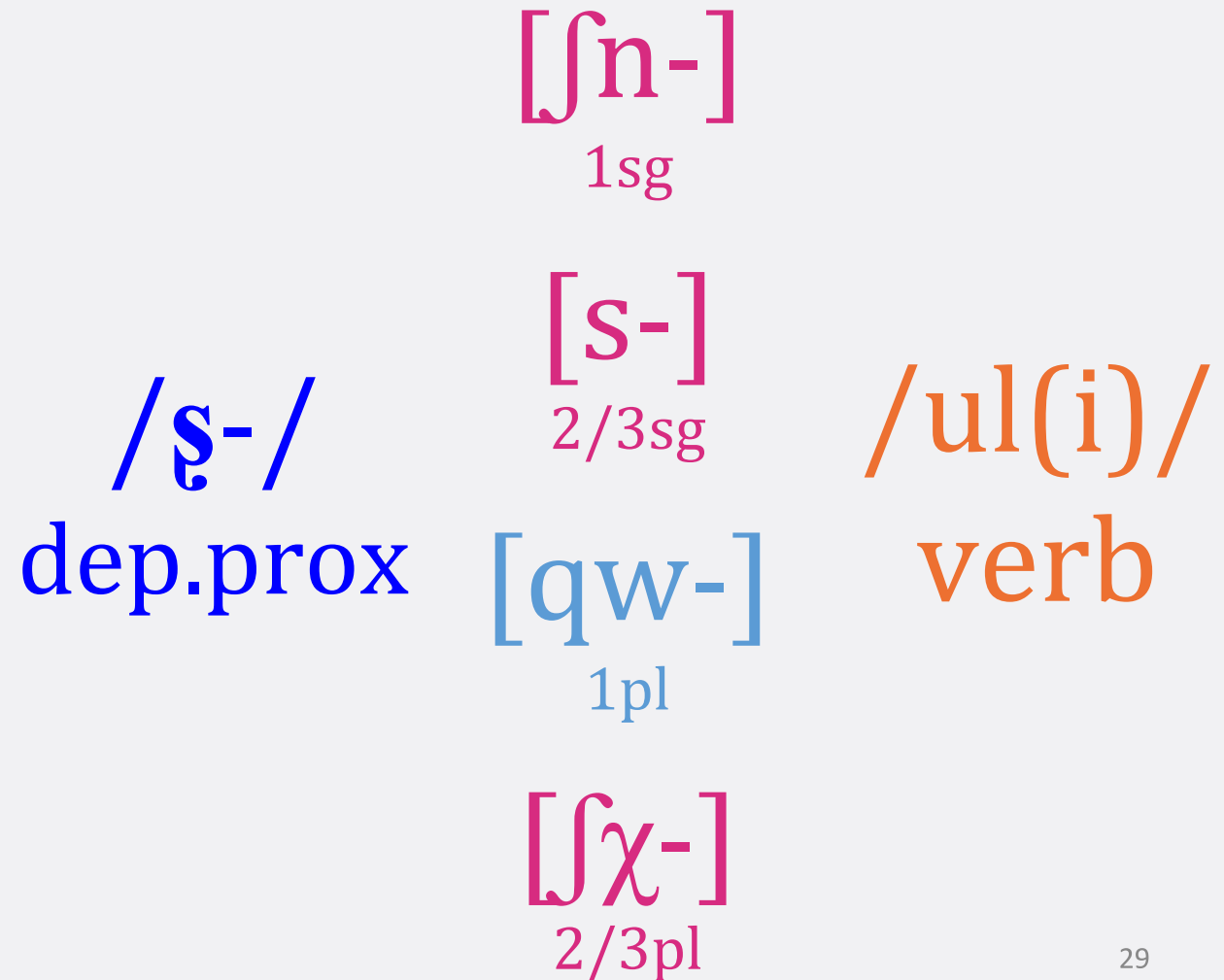
1pl.abs

arrive

‘... (when) I arrived’

Absolutive Clitic: Dependent

- Phonological Form
 - Singulars and 2/3pl start with a **fricative**
 - 1pl starts with **stop**



Absolutive Clitic: Dependent

- Phonological Form
 - Singulars and 2/3pl start with a **fricative**
 - 1pl starts with **stop**

Crucially, only the **clitics beginning with an affricate** undergo the alternation

/ʃ-/
dep.prox

[ʃn-]

1sg

[s-]

2/3sg

[qw-]

1pl

[ʃχ-]

2/3pl

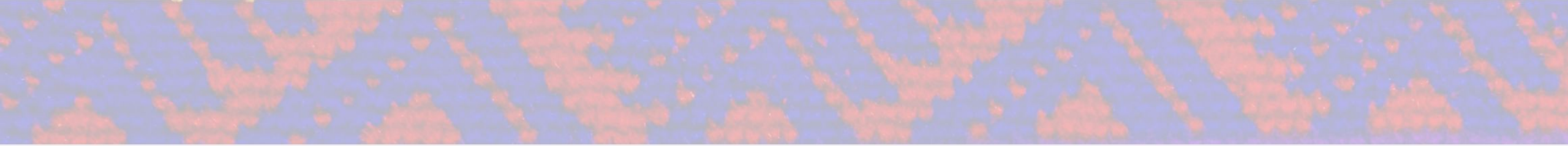
/ul(i)/
verb

Absolutive Clitic: Matrix vs. Dependent

	[tʃn-] 1sg				[ʃn-] 1sg	
/ma-/ mat.prox	[ts-] 2/3sg	/ul(i)/ verb	/ɬ-/ dep.prox	[s-] 2/3sg	/ul(i)/ verb	
	[qw-] 1pl			[qw-] 1pl		
	[tʃχ-] 2/3pl			[ʃχ-] 2/3pl		

Absolutive Clitic: Matrix vs. Dependent

	[t ʃn-] 1sg				[ʃn-] 1sg	
/ma-/ mat.prox	[t s-] 2/3sg	/ul(i)/ verb	/ʃ-/ dep.prox	[s-] 2/3sg	/ul(i)/ verb	
	[qw-] 1pl			[qw-] 1pl		
	[t ʃχ-] 2/3pl			[ʃχ-] 2/3pl		



Subsegmental Subtraction Analysis

Matrix

1.SG

/ma-/
mat.prox

tsn-

/ul(i)/
verb

2.SG

/ma-/
mat.prox

ts-

/ul(i)/
verb

Matrix

1.SG

/ma-/
mat.prox

tsn-

/ul(i)/
verb

2.SG

/ma-/
mat.prox

ts-

/ul(i)/
verb

Matrix

1.SG

$/tʃ/$
↓
(t^1 $ʃ^2$ $ʃ^3$)

2.SG

$/ts/$
↓
(t^1 s^2 s^3)

Dependent

1.SG

/ɤ-/
dep.prox

ɲn-

/ul(i)/
verb

2.SG

/ɤ-/
dep.prox

s-

/ul(i)/
verb

Dependent

1.SG

/ɛ-/
dep.prox

ɲn-

/ul(i)/
verb

2.SG

/ɛ-/
dep.prox

s-

/ul(i)/
verb

Dependent

1.SG

/tʃ/

2.SG

/ts/

Dependent

1.SG

$/tʃ/$
↓
(t^1 $ʃ^2$ $ʃ^3$)

2.SG

$/ts/$
↓
(t^1 s^2 s^3)

Dependent

1.SG

/tʃ/
↓
(t¹ ʃ² ʃ³)

2.SG

/ts/
↓
(t¹ s² s³)

Subsegmental deletion generalizations

When /ʃ-/ 'dep.prox' precedes an affricate,

- (does not apply to stops)

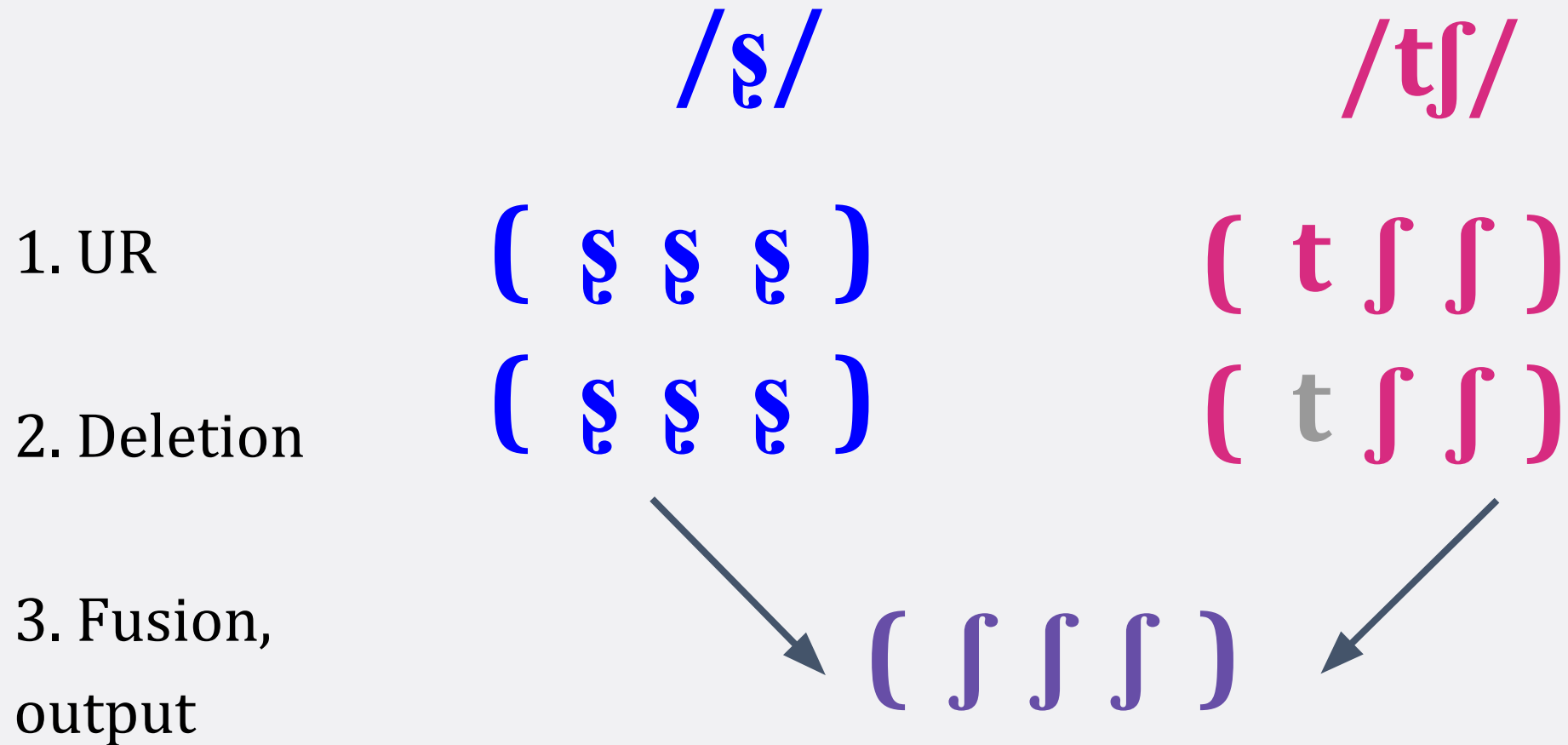
the first subsegment of the affricate is deleted

- tʃ > ʃ, ts > s

Note: the sequence /ʃ/ + /ʃ or s/ results in fusion of the two fricatives.

- *[ʃʃ]

Deletion and fusion



This is not segmental deletion

1. Affricates are not clusters
 - **[t-s] and [ts] are distinct**
2. Segmental deletion is a separate process
 - Ixtahuacán Mam shows a pattern of **full segment deletion** in addition to the pattern shown here

1: Cluster vs Complex Segment

t-s-

[t-] is the 2/3sg possessive prefix

sipχ

‘headwrap’

t-sip-i

‘your headwrap’

ts-

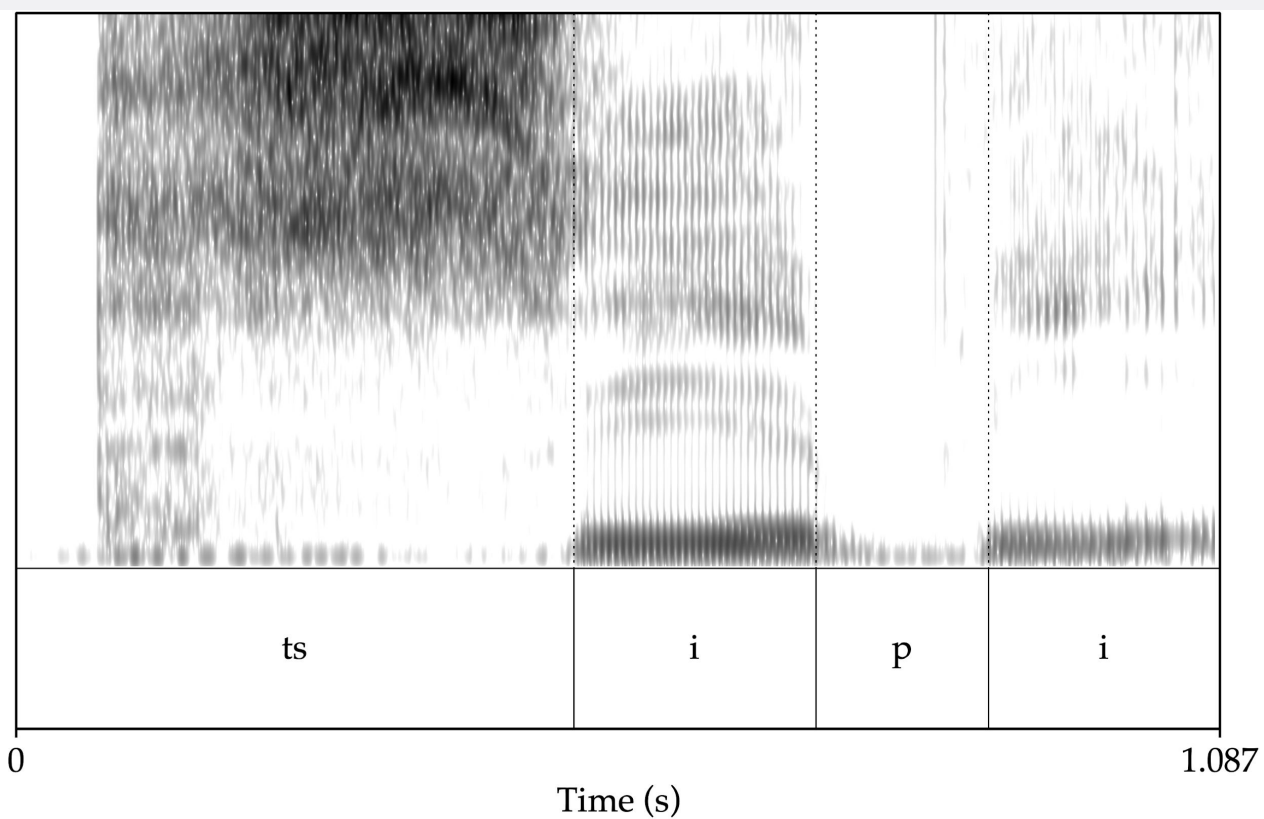
[tsaχ] is monomorphemic

tsaχ

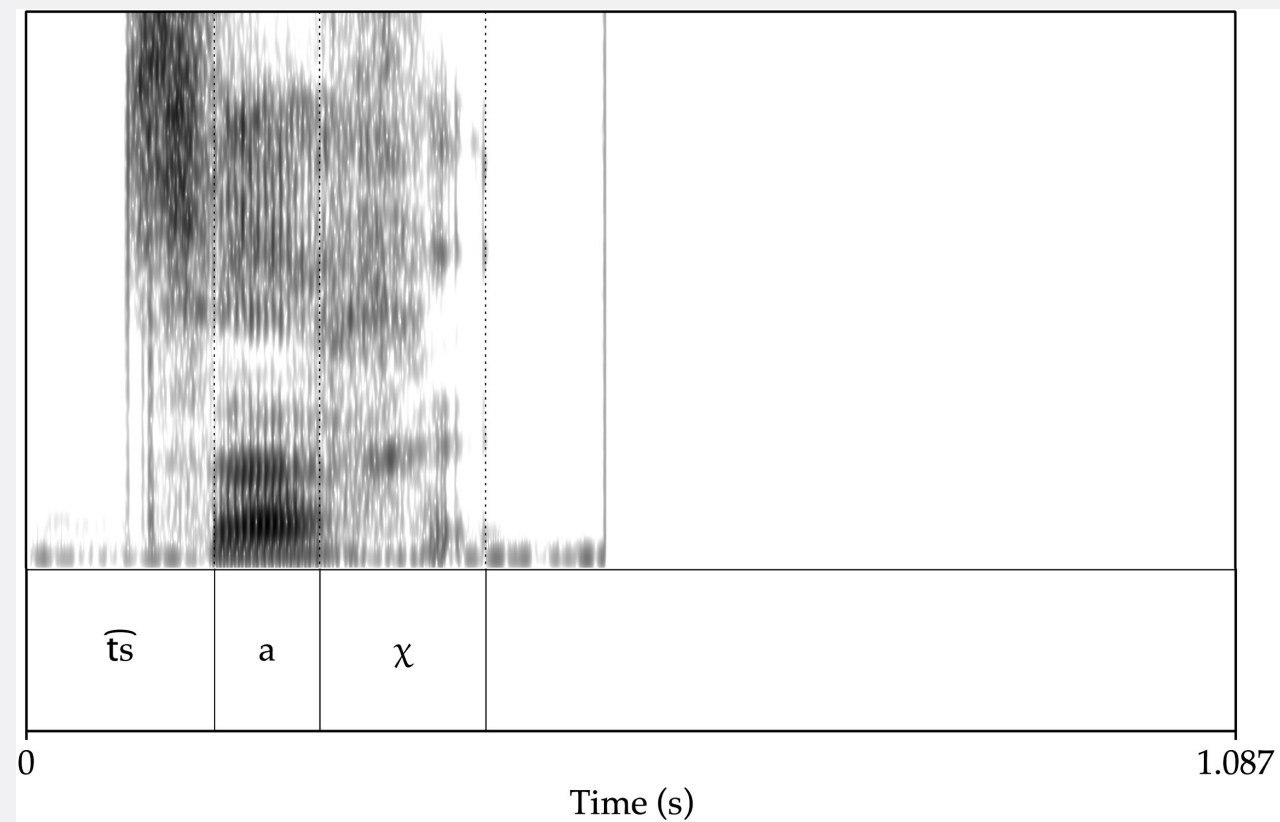
‘pine tree’



t-sipi



tsax



1: Cluster vs Complex Segment

t-ʃ-

[t-] is the 2/3sg possessive prefix

ʃel

‘grandmother’

t-ʃel-i

‘your grandmother’

tʃ-

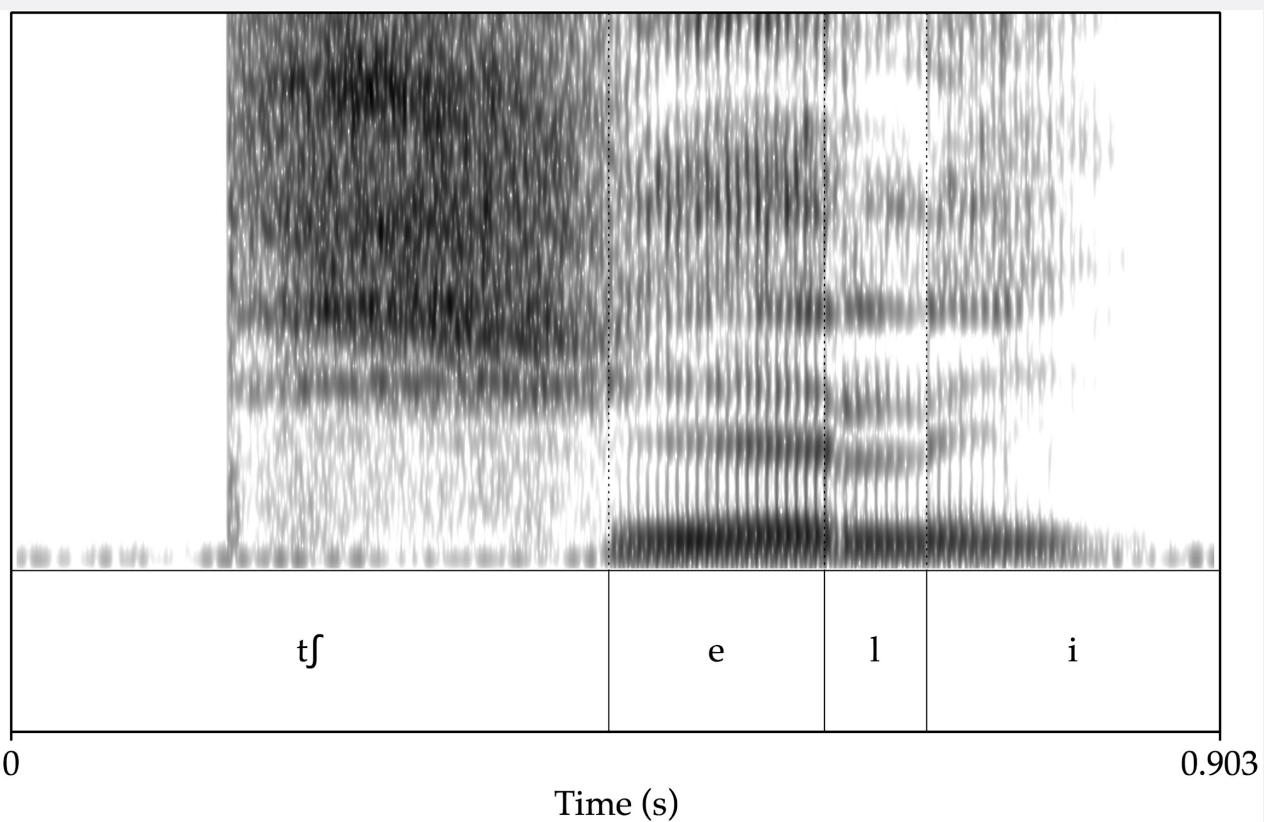
[tʃeχ] is monomorphemic

tʃeχ

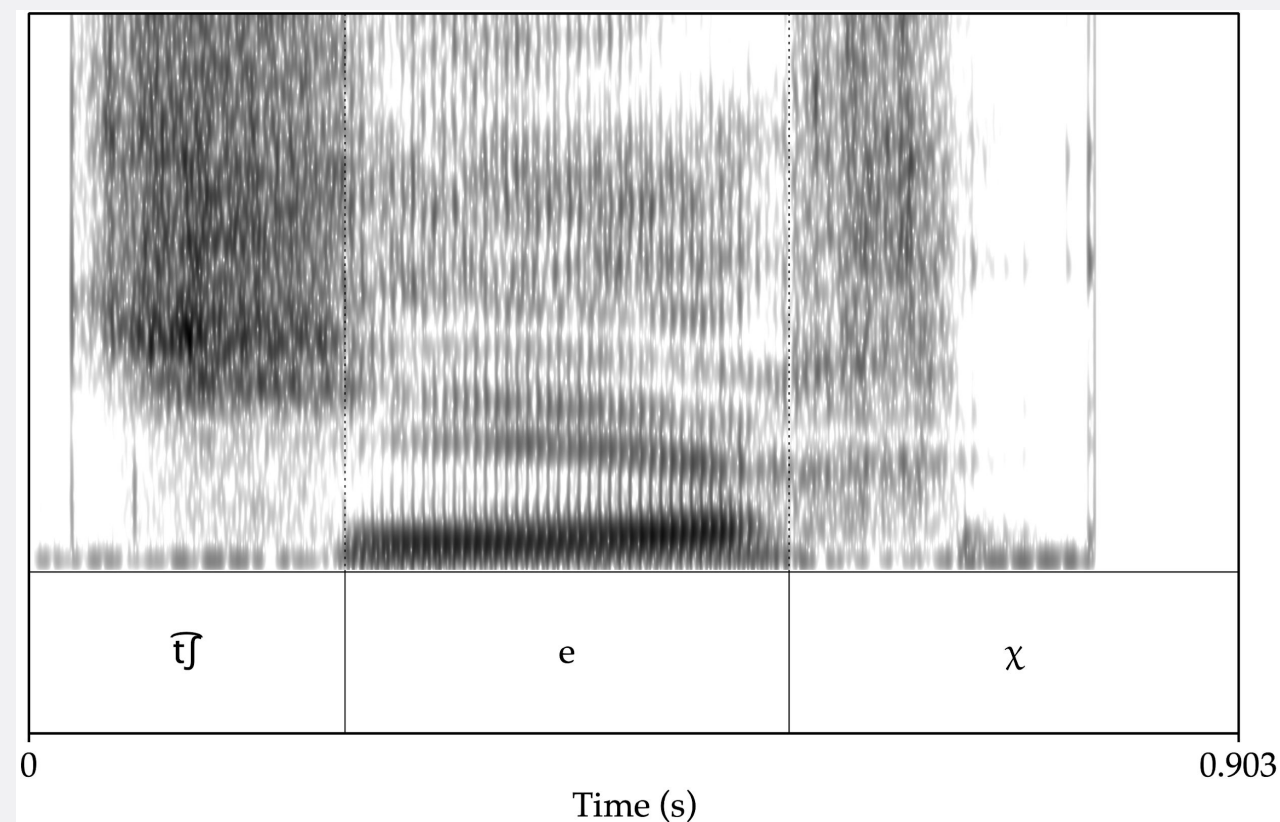
‘horse’



t-feli



tfex



Cluster vs Complex Segment: Q theory representation

Underlying /t+f/ cluster			
[Q]	V	t	ɸ
(q q q)	(v v v)	(t t h)	(ɸ ɸ ɸ)
gestural score	oral constriction		
	voicing		voicing

Underlying /tʃ/ complex segment		
[Q]	V	tʃ
(q q q)	(v v v)	(t ɸ ɸ)
gestural score	oral constriction	
	voicing	voicing

2: Ixtahuacan Mam (England 1983: 59, 162)

- The **subsegmental** deletion process in the dependent **proximate** holds
- In addition, Ixtahuacan Mam shows **segmental** deletion in the dependent **perfective** (England 1983, 2017)
- Deletion of the first segment [Q] of the clitic

(4) t-uj b'e [in jaw tz'aq-a]
 Ø-chin
 3sg-rn/in road [dep.perf-1sAbs dir slip-1s]
 'In the road I slipped (a while ago)'

2: Segmental deletion in Ixtahuacan Mam

(England 1983: 59,162)

Clitic	Matrix	Dependent perfective
1sg	[tʃin-]	[in-]
2/3sg	[ts-]	[∅-]
1pl	[qo-]	[o-]
2/3pl	[tʃi-]	[i-]

- All clitics lose the first segment
 - Including 1.pl

2: Segmental deletion in Ixtahuacan Mam

(England 1983: 59,162)

Clitic	Matrix	Dependent perfective
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1pl	[qo-]	[o-]
2/3pl	[tʃi-]	[i-]

- All clitics lose the first segment
 - Including 1.pl
- [Q] deletion is blind to whether the first segment is an affricate

Subtraction in Mam

- In both dialects, we see deletion of the first **subsegment** of affricates in absolute clitics.
 - In Ixtahuacan Mam, we also see deletion of the first full **segment** of the clitic.
- Mam shows us both *segmental and subsegmental* **subtraction**

Morphological trigger

- The triggering of the subsegmental deletion process is the dependent proximate morpheme (bundle of morphosyntactic features)
- In Ixtahuacán Mam it is clear:

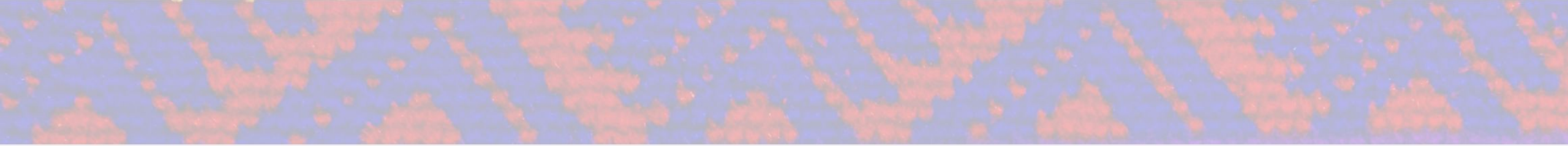
	<u>form</u>
○ [dependent proximate] triggers [q] deletion	/ɣ/
○ [dependent perfective] triggers [Q] deletion	∅
- The alternation is **morphologically conditioned**

Against a simple lenition analysis

- An alternative analysis is that this is a case of segmental lenition process, rather than of subsegmental deletion
 - [-continuant] → [+continuant]
 - This predicts that the 1.pl clitic **[qw-]** [-continuant] will become **[χw-]**
- However, this pattern is not observed
 - Therefore, we rule out the segmental lenition analysis

Accounting for the resistance of [qw-]

- A crucial difference
 - Affricates have **2 gestural targets**
 - Stops have **1 gestural target**
- We can state the subsegmental deletion as **deletion of 1 target**
- In the case of stops, the **pressure to remain faithful** to at least one target wins out over the deletion



Conclusion

Conclusion

- We presented a robust case of **phonological subtraction**
 - dependent aspectual morphemes trigger the **deletion of the first phonological unit** of the following morpheme
- This is the first case of analyzing an affricate / fricative alternation as **subsegmental** subtraction
- The alternation is **morphologically** conditioned
 - One morpheme triggers subsegmental [q] subtraction
 - A separate morpheme triggers full segment [Q] subtraction
- **Q-Theory** offers a representational model that easily accounts for both segment- and *subsegment*-level deletion



Thank you!

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'In the road I slipped (a while ago)'

- Segmental deletion in the dependent perfective