

The challenges and advantages of representing variation in grammars

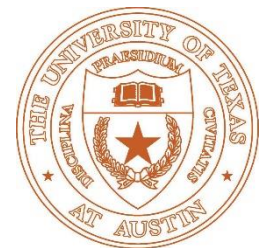


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Descriptive Grammars and Typology – University of Helsinki



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Overview

1. Tug of war: traditional grammar vs. variation
2. Challenges and possible solutions in representing Shiwiar variation
 - a) Phonetic variation
 - b) Palatalisation
 - c) Vowel harmony
3. The advantage of conveying variation
4. Future outlook



Grammars

- The main purpose of a grammar is to serve as a catalogue of linguistic structures
- Almost by definition, grammars are biased towards discrete and contrastive categories

(1) *tʃuú utʃiɾihʲãĩ nakúɾijn ácmiaji*



Variation

- Variation is a key feature of language:
 - Divergences within the speech of a single person
 - Divergences across speakers
 - Grammatical categories with fuzzy boundaries
- Variation is often thought of as an impediment:
 - Low level variation might be considered irrelevant “noise”
 - Some forms of variation (e.g. code switching) are actively avoided in grammars



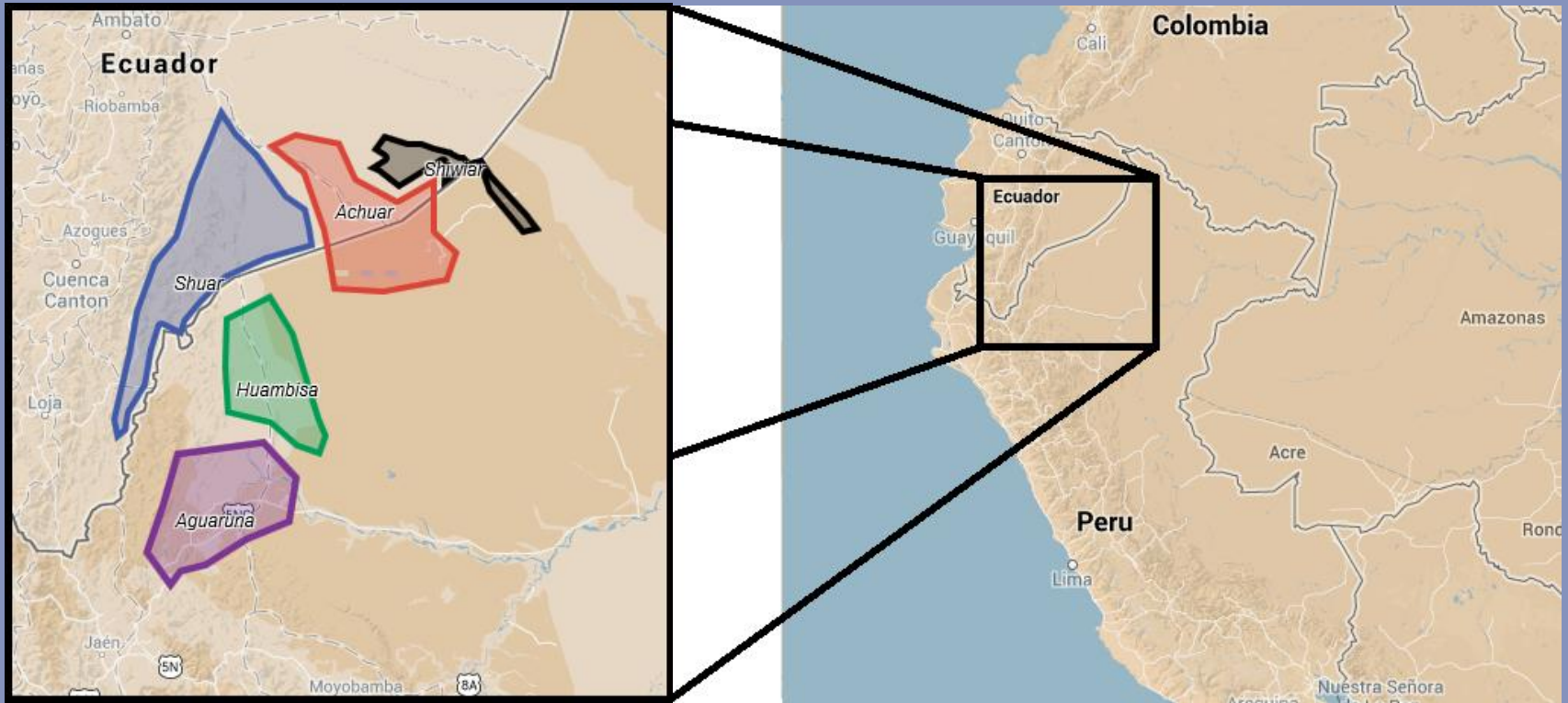
Variation

- Variation can provide extremely valuable insights into language change, especially in languages for which there is no/little previous documentation
- By ‘smoothing’ out variation, a grammar writer might inadvertently delete important data from the record
- Representing variation as fully as possible enriches documentation and analysis

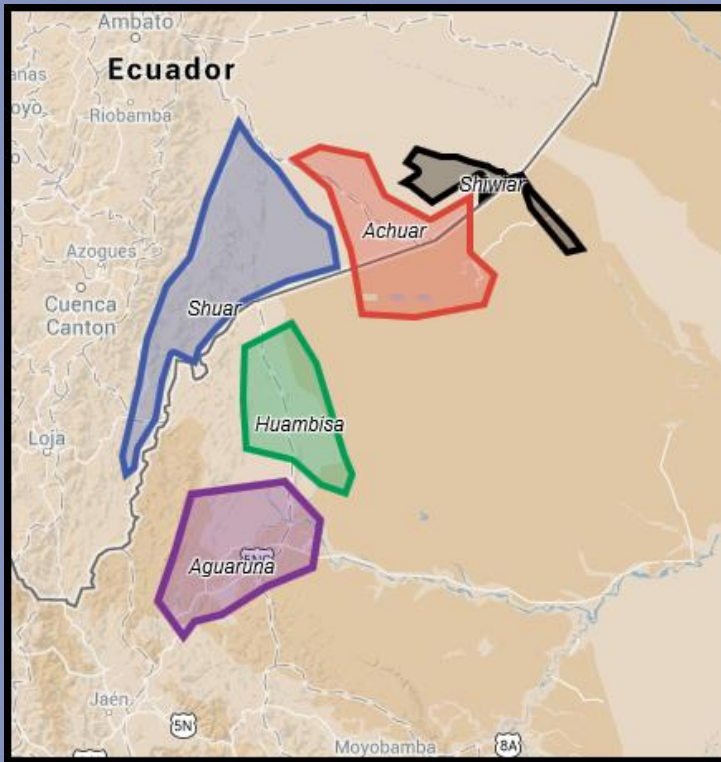


Chicham Languages

(also: Jivaroan languages)

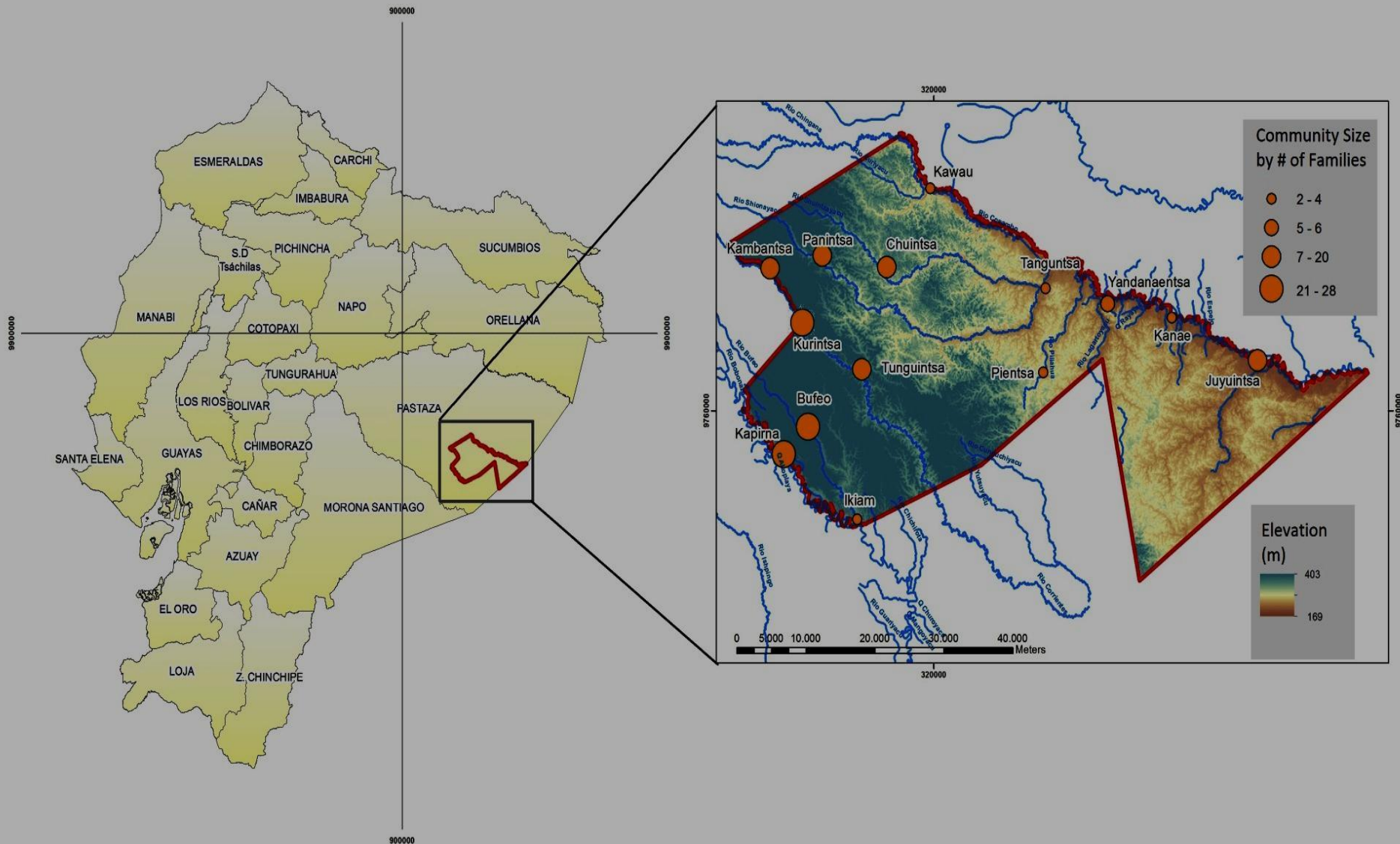


Chicham Languages



- Shuar: 62,000 speakers
- Aguaruna: 55,400 speakers
- Huambisa: 10,200 speakers
- Achuar: 24,400 speakers
- Shiwiar: 1,200 speakers

The Shiwiar Language



Chicham Languages

- Highly synthetic, largely suffixing/encliticising
- Nominative-accusative alignment
- Complex verbal morphology
- Frequent morphophonological alternations
- Pervasive clause chaining with switch-reference



Phonetic Variation

- There is a high degree of phonetic variation across the Shiwiar speech community.

(2) *nahamrútawai*

naham-rú-ta-wa-i

hurt-APPL-1SG.O-IPFV-3.S-DECL

‘I’m in pain. (Lit. ‘It hurts me.)’

(T01-S01-01.wav; elicitation; 11:24-11:26)

Phonetic Variation

- There is a high degree of phonetic variation across the Shiwiar speech community.

(3) [ᵛahəmbɾúʈəwəi]

nahamrútawai

naham-rú-ta-wa-i

hurt-APPL-1SG.O-IPFV-3.S-DECL

‘I’m in pain. (Lit. ‘It hurts me.)’

(T01-S01-01.wav; elicitation; 11:26-11:27)

Phonetic Variation

- There is a high degree of phonetic variation across the Shiwiar speech community.

(4) [pán̩d̩rə̩ji]

pánraji

pan-ra-ji

become.bright-PFV-3.SG + DECL

‘It (the sky) became bright.’

(T01-S01-02.wav; elicitation; 07:33-07:33)

Phonetic Variation

- There is a high degree of phonetic variation across the Shiwiar speech community.

(5) [pán̩rəji]

pánraji

pan-ra-ji

become.bright-PFV-3.SG + DECL

‘It (the sky) became bright.’

(T01-S01-02.wav; elicitation; 07:26-07:27)

Phonetic Variation

- Adding a phonetic line to every example is a possibility but it is cumbersome if narrow transcription is required.
- How narrow a phonetic transcription is necessary in order to fully represent all phonetic variation?
- Solution: I use a broad phonetic transcription, but make every example audible by click in the PDF, and resolvable to the original data.



Palatalisation in Shiwiar

- Shiwiar has 14 consonant phonemes:

	Bilabial	Dental/ Alveolar	Postalveolar/ Palatal	Velar	Glottal
Stops	p	t		k	
Fricatives		s	ʃ		h
Affricates		ts	tʃ		
Nasals	m	n		ŋ	
Rhotic		r			
Glides	w		j		

Palatalisation in Shiwiar

- The consonants /p, t, k, h, m, n, w/ become palatalised when they are preceded by /i/:

jutai 'food'

hapa 'deer'

maku 'leg'

aha 'garden'

pama 'tapir'

winuɪr 'my lip'

suwɪ 'neck'

siʈu 'small'

ipiʌmat 'thunder'

ikiʌm 'forest'

nihʌmantʃ 'chicha'

hiɲar 'two'

iniʌk 'type of tree'

siwʌr 'Shiwiar'



Palatalisation in Shiwiar

- Because palatalisation is predictable, it is tempting to analyse it as an allophonic process
- If that is the case, palatalised consonants are not phonemic and do not need to be represented in transcription

[ʃiw^jar] /ʃiwar/



Problems

- There are independent vowel devoicing and elision process in Shiwiar which can result in the loss of /i/ before a palatal consonant, e.g. in /ikaihtuk/ > /kahtuk/ 'faint':

[ik^jaih^jt^juk]

> [i_̰k^jai_̰h^jt^juk]

> [k^jah^jt^juk]



Problems

- In some loan words, palatalisation does not occur even if the right phonological environment occurs:

[kapiwar] /kapiwar/ ‘capybara’

- This means that palatalised consonants are in contrastive distribution with non-palatalised consonants in certain cases.



Incipient phonologization

- If palatalisation is predictable in some words, but is not predictable in others, should palatalisation be considered phonemic?
 - I consider it semi-phonemic.
- How should this be represented in a grammar?
- Solution: I represent palatalisation with a superscript j (even at the phonemic level) wherever it occurs because it is not completely predictable.

Vowel Harmony

A wide variety of languages exhibit phoneme co-occurrence restrictions within phonological domains

- Vowel harmony (VH)

Usually considered a unitary phenomenon:

- Mostly categorical
- Languages are said to have harmony within a particular domain or not



Vowel Harmony

- How does vowel harmony phonologise?
- Are there languages with harmonic tendencies that have not (yet) phonologised?
- How much harmony is necessary in order for a language to “have vowel harmony”?

The case of Shiwiar



Shiwiar Vowels

- No phonotactic restrictions on any of the vowels:
 - They can occur anywhere within a word
 - They can occur in open and closed syllables

	Front			Central			Back		
High	i	ĩ	(ḭ)	ɨ	ĩ	(ḭ)	u	ũ	(ṵ)
Low				a	ã	(a̰)			

The Observation

- Impressionistically, a notably large number of words contain identical vowels within the root.
- This is sometimes hidden because many lexicalised stems are combinations of morphemes (root + derivation):

naŋkatramu
end



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hintʃa
path

naŋkatramu = n
end = ACC

hiahai
see

‘I see the end of the path.’



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The Observation

- Impressionistically, a notably large number of words contain identical vowels within the root.
- /kuru/ 'porcupine'
- /tikitsik/ 'one'
- /himpitsits/ 'type of hummingbird'
- /waŋkatsapa/ 'type of calabash'



Vowel Harmony?

Goal: Assess degree of vowel harmony by examining adjacent vowel pairs (Sanders & Harrison 2012)

- Adjacent vowel pairs are a very low-level domain for harmony, so non-categorical tendencies are likely to be found at this level



Vowel Harmony?

Data: 760 Shiwiar roots

- 500 roots from documentary corpus (Kohlberger in prep.)
- 260 roots from a dictionary (Fast Mowitz et al. 2008)
- Only monomorphemic roots were taken



Vowel Harmony?

Pre-calculation: 1 hour recording of connected speech to compute vowel frequencies

$/a/ = 42.3\%$

$/i/ = 21.2\%$

$/u/ = 24.5\%$

$/ɨ/ = 12.0\%$

These frequencies were taken as a given for Shiwiar.



Expected Co-Occurrence Frequencies

$\downarrow 1^{\text{st}} / 2^{\text{nd}} \rightarrow$	a	i	u	i
a	17.9%	9.0%	10.4%	5.1%
i	9.0%	4.5%	5.2%	2.5%
u	10.4%	5.2%	6.0%	2.9%
i	5.1%	2.5%	2.9%	1.4%

Observed Co-Occurrence Frequencies

↓1 st / 2 nd →	a	i	u	i
a	24.5%	7.9%	7.7%	3.5%
i	5.8%	9.1%	1.9%	1.1%
u	6.1%	6.5%	12.3%	1.6%
i	2.6%	1.4%	1.8%	6.3%

Observed Co-Occurrence Frequencies

↓1 st / 2 nd →	a	i	u	i
a	24.5%	7.9%	7.7%	3.5%
i	5.8%	9.1%	1.9%	1.1%
u	6.1%	6.5%	12.3%	1.6%
i	2.6%	1.4%	1.8%	6.3%

Difference between Expected and Observed

$\downarrow 1^{\text{st}} / 2^{\text{nd}} \rightarrow$	a	i	u	i
a	6.6%	-1.1%	-2.7%	-1.6%
i	-3.2%	4.6%	-3.3%	-1.5%
u	-4.2%	1.3%	6.2%	-1.4%
i	-2.4%	-1.1%	-1.2%	4.9%

Difference between Expected and Observed

$\downarrow 1^{\text{st}} / 2^{\text{nd}} \rightarrow$	a	i	u	i
a	6.6%	-1.1%	-2.7%	-1.6%
i	-3.2%	4.6%	-3.3%	-1.5%
u	-4.2%	1.3%	6.2%	-1.4%
i	-2.4%	-1.1%	-1.2%	4.9%

Difference between Expected and Observed

↓1 st / 2 nd →	a	i	u	i
a	6.6%	-1.1%	-2.7%	-1.6%
i	-3.2%	4.6%	-3.3%	-1.5%
u	-4.2%	1.3%	6.2%	-1.4%
i	-2.4%	-1.1%	-1.2%	4.9%

Difference between Expected and Observed

↓1 st / 2 nd →	a	i	u	i
a	6.6%	-1.1%	-2.7%	-1.6%
i	-3.2%	4.6%	-3.3%	-1.5%
u	-4.2%	1.3%	6.2%	-1.4%
i	-2.4%	-1.1%	-1.2%	4.9%

This distribution is significantly more harmonic than what would be expected by chance.

$$\chi^2 (15, N=571) = 230.84, p < 0.01$$

Result

52% of adjacent vowel pairs harmonise fully.

44% of roots contain only identical vowels.

Even though Shiwiar has no active process of vowel harmony in its phonology, the distribution of its vowels within monomorphemic roots is significantly skewed towards (complete) harmony.



Implications for Phonology

- The harmonic tendencies in Shiwiar provide insight into the diachronic development of vowel harmony.
- Why would the distribution of vowels be so skewed in Shiwiar?
- Long term effects of co-articulation



Coarticulation and Phonologisation

- It has been shown that vowels coarticulate with one another across intervening consonants (Öhman 1966) and even up to a distance of multiple syllables (Magen 1997)
- Vowel harmony may well result from the phonologisation of vowel-to-vowel coarticulation (Ohala 1993)



Diachronic Development

- The Shiwiar data is a snapshot in time and cannot be said to move towards or away from vowel harmony.
- But this is where synchronic variation comes to our rescue...



Variation!

For a large number of words, the vowels in the root are variable. Almost always, one of the variants available is harmonic:

antúcham ~ untúcham

‘ocelot’

iyáktin ~ ayáktin

‘to add salt’

ejámkatin ~ ajámkatin

‘to protect’

esámu ~ asámu

‘bite’

esát ~ asát

‘dry season’

jurértin ~ jerértin

‘to give birth’



Factors Enhancing Coarticulation

In the cases where there is variation, the alternating vowel is unstressed and harmonises with the stressed vowel in the root.

antúcham ~ untúcham

‘ocelot’

iyáktin ~ ayáktin

‘to add salt’

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Tendential Harmony

- Although vowel harmony is not an active phonological process in Shiwiar phonology, Shiwiar is a language with a strongly harmonic vowel distribution in roots.
- Interspeaker variation supports the hypothesis that co-articulation of vowels within a root may have shaped the current harmonic distribution of Shiwiar vowels.



Variation in grammars

- Variation can provide crucial information about the nature of linguistic structures.
- Variation can also afford key insights into the diachronic development of those structures.
- How do we represent variation and “fuzzy categories” in grammars?
 - By being as faithful to the data as possible, even if it means having a “messier” presentation.



Exploring digital resources

- Digital grammars?
 - Updated and improved over time
 - The ability of linking primary data (especially audio and video media) directly to the text
 - Can cross-reference thousands of examples to each individual grammatical phenomenon covered



Acknowledgements



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- Öhman, S. E. G. (1966). Coarticulation in VCV utterances: Spectrographic measurements. *Journal of the Acoustical Society of America*, 39:151–168.
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