Phonology in multilingual grammars: Representational complexity and linguistic interfaces

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"Be not afeard. [this talk] is full of noises,
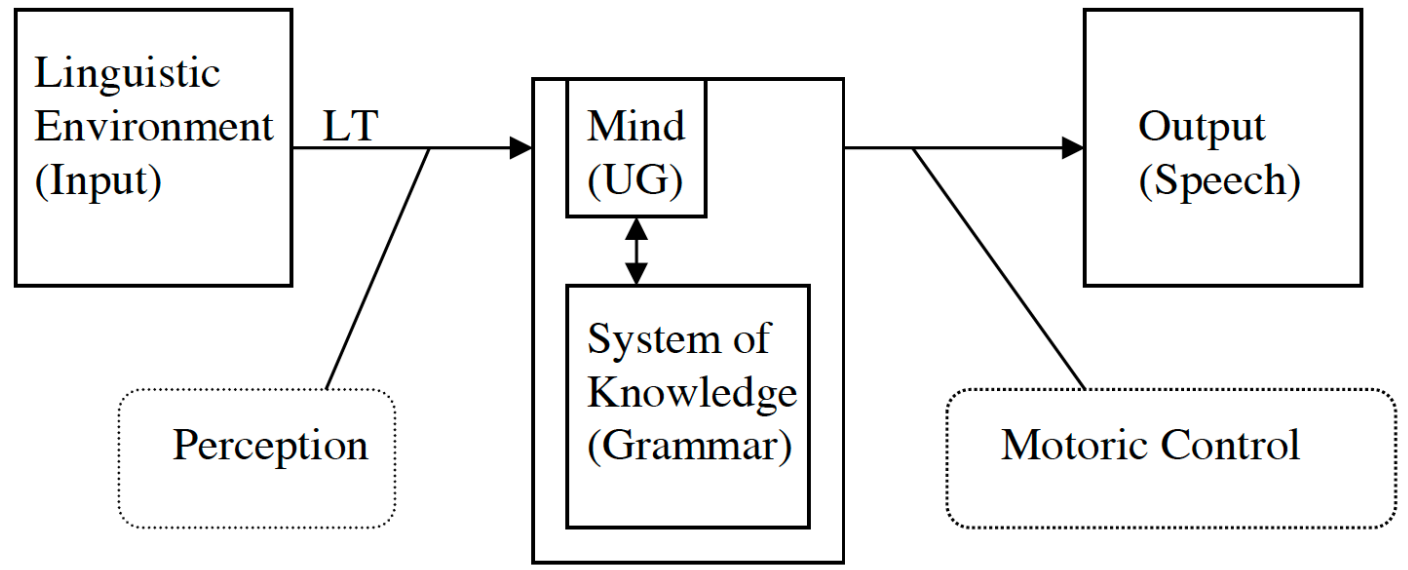Sounds, and sweet airs, that give delight, and hurt not."
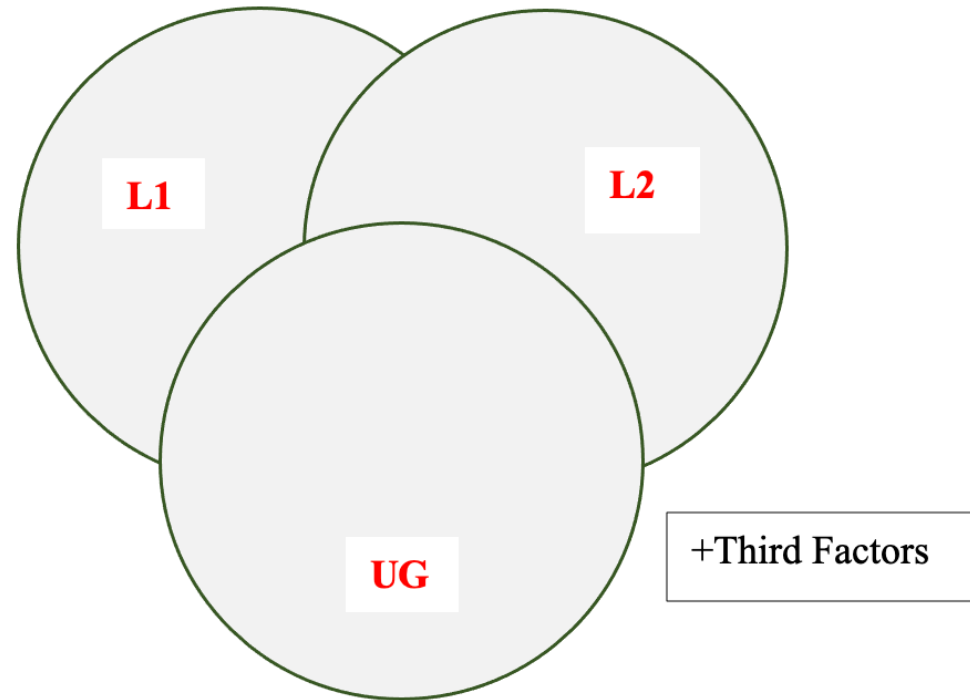
--William Shakespeare, *The Tempest*

PHONOLOGY

- Generative

- Learned (not noticed)

- Hierarchical (not shallow); recursive

- It's not just *output* phonetics (VOT and formant structure)
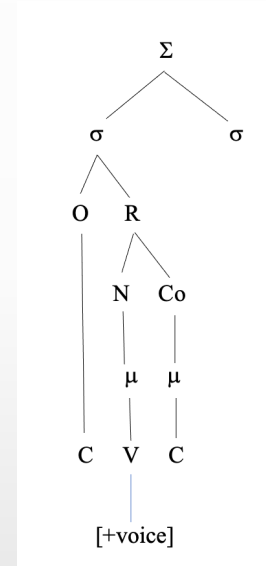
- Phonetics is the ***input*** to the learner

FULL ACCESS

López (2020); Lightfoot (2020)
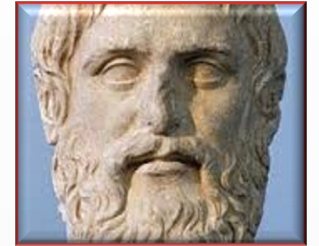
POVERTY OF THE STIMULUS

- Features

- Onsets

- Coda

- Moras

- Feet

- Just like things like *noun* or *verb*, these don't come labelled in the input
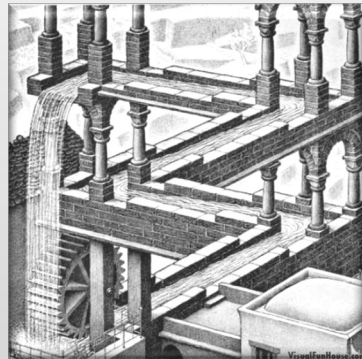
L*x* LEARNABILITY

Plato's Problem

Orwell's Problem

Escher's Problem

Challenges for input-driven models.

- Plato: selecting structures in the absence of evidence
  - moras

- Orwell: not learning in the face of abundant evidence
  - /y/, /θ/

- Escher: producing and hearing things that aren't in the input
  - Illusory vowels; hearing/saying *street* as [istrit]

PHONOLOGY = COGNITION

- Not physics
- Not noticing

But, of course, interfacing with input and output systems

FEATURES

Features absent from the L1 *can* be acquired

L1 Spanish; L2 Yucatec Mayan ejectives
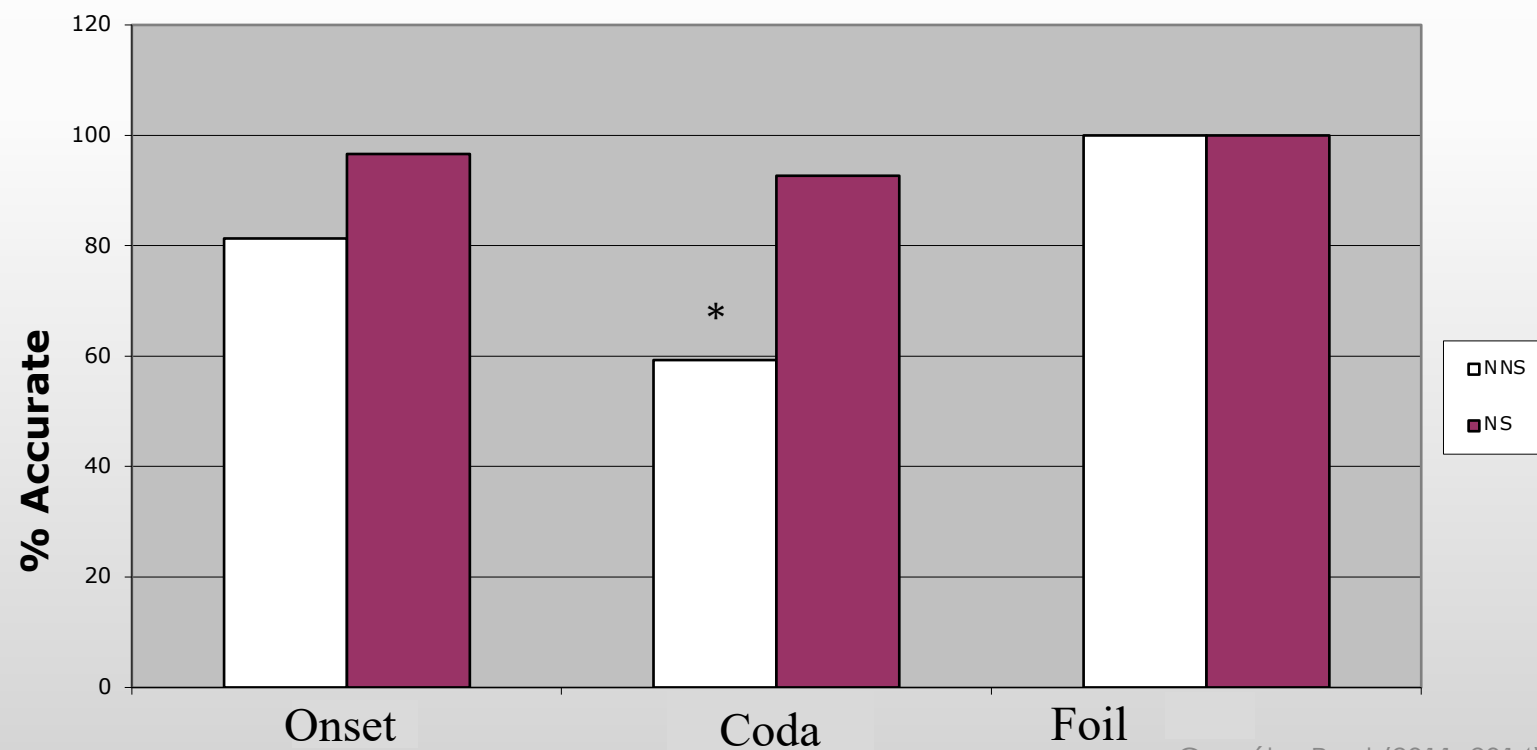
González Poot (2011, 2014)

FEATURES

González Poot (2011; 2014)

FEATURES

- Onsets: k' /p' > t' /tʃ' > ts'

- Codas: tʃ' > ts' > k' >' p' > t'

- Such paths are phonetically and typologically grounded

González Poot (2011; 2014)

FEATURES

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- Such paths are phonetically and typologically grounded

González Poot (2011; 2014)

FEATURES

- Onsets: k' /p' > t' /tʃ' > ts'
- Codas: tʃ' > ts' > k' >' p' > t'

- Such paths are phonetically and typologically grounded

González Poot (2011; 2014)

CUE ROBUSTNESS

- Intake frequency

- Identifying the subset of input

that becomes intake

- Predicts the path of

phonologization of

[constricted glottis]

Archibald (2013)
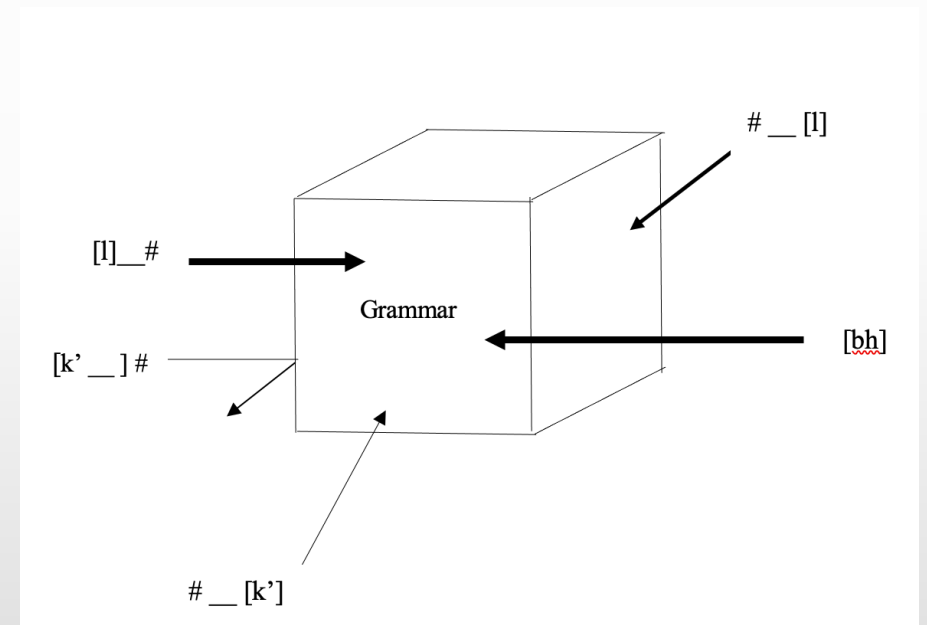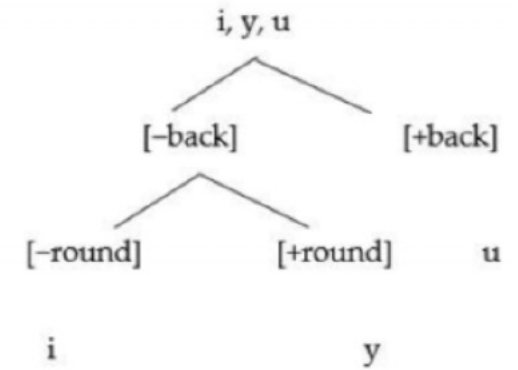
Features are hierarchical

a. [± round] > [+back]   (Finnish)

b. [+back]   > [± round]   (Quebec French)

Figure 1. Two possible contrastive hierarchies for a 3-vowel inventory.

Dresher (2009); Hall (2017); Purnell, Raimy & Salmons (2019); Natvig (2020)

FEATURES

Are hierarchical:

a. [± round] > [±back]   (Finnish)   b.   [±back]   > [± round]   (Quebec French)

      i, y, u   i, y, u

[-round]   [+round]   [−back]   [+back]

i   [−back]   [+back]   [−round]   [+round]   u

y   u   i   y

Figure 1. Two possible contrastive hierarchies for a 3-vowel inventory.

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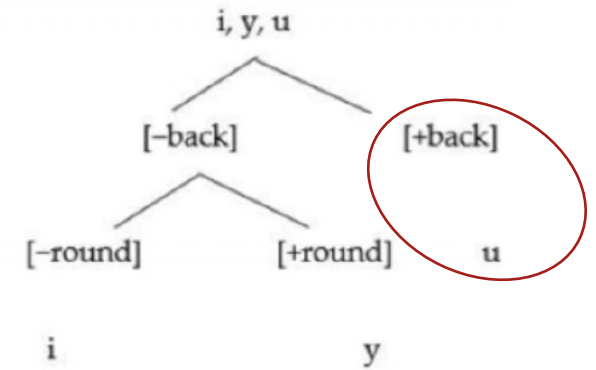
INVENTORY EFFECTS
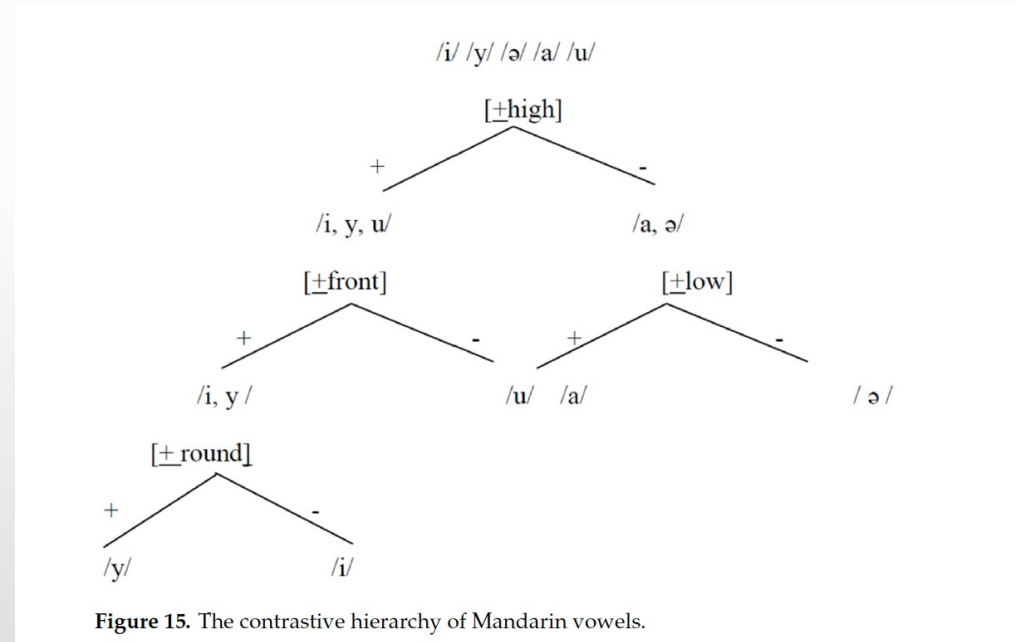
Figure 15. The contrastive hierarchy of Mandarin vowels.

L1 Mandarin difficulty
with L2 English
lax vowels but not
/e/ and /o/

Not just local comparisons (contra SLM-r)

Wu (2021)
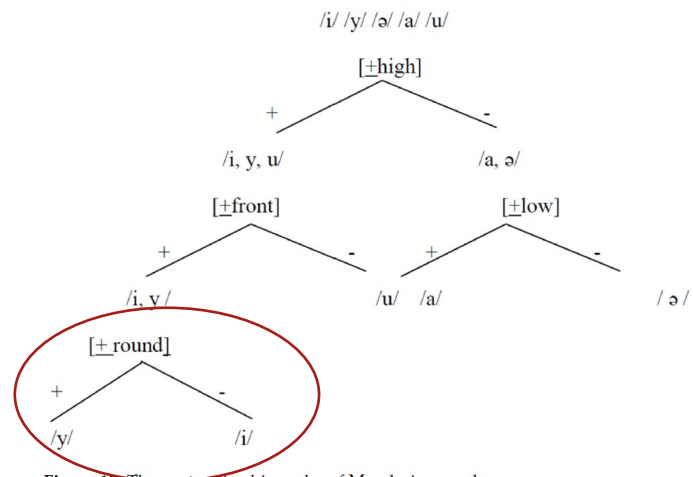
Figure 15. The contrastive hierarchy of Mandarin vowels.

Redeployment of [round]
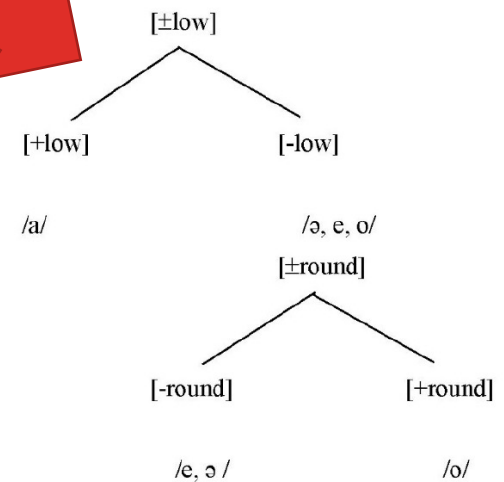
Figure 16. The Mandarin contrastive hierarchy applied to English vowels.

L3 I-PROXIMITY EXPLAINED

Table 2. Vocalic features.

Arabic	[low] > [back]
French (Hall 2017)	[nasal] > [long] > [low] > [high] > [back] > [round]
English (Oxford 2012)	[long] > [low] > [front] > [high] > [round]
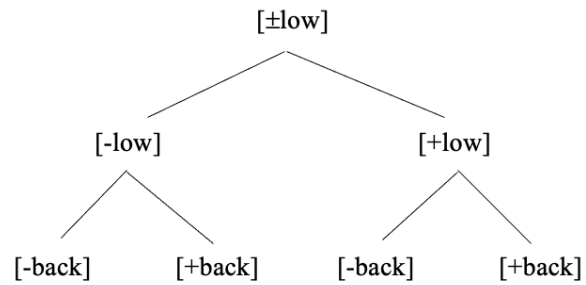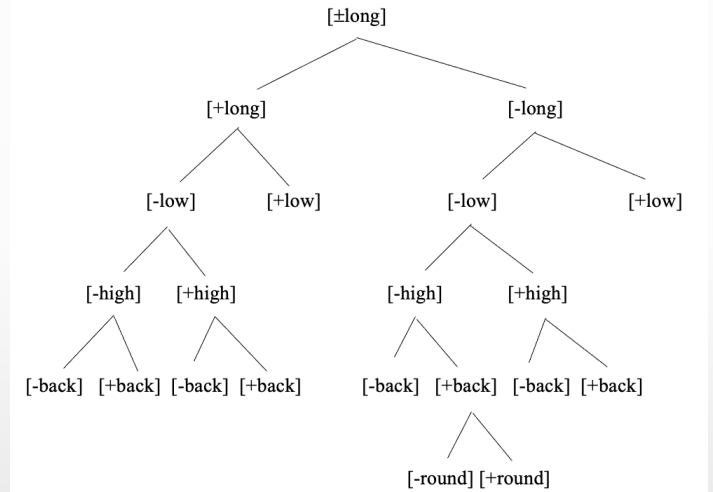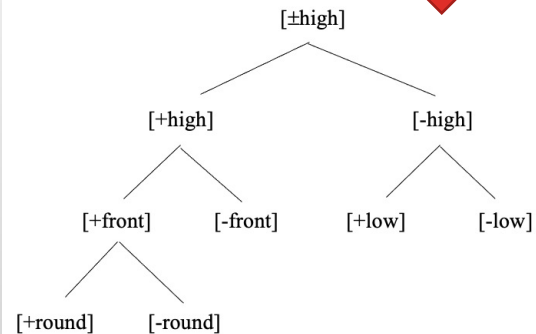
Learning involves features and rankings.

Archibald (2021, 2022)

SYLLABLES

Syllables are hierarchical
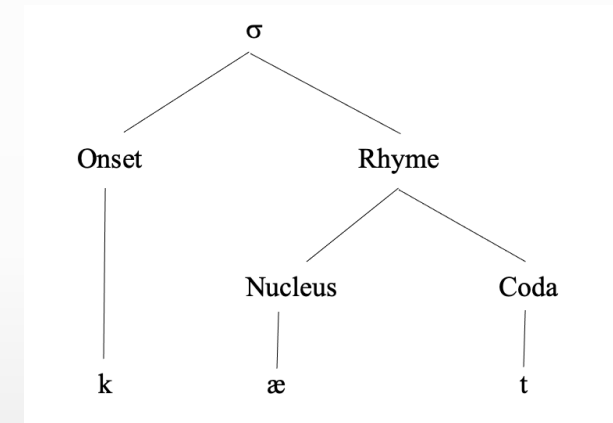
- Cardoso (2007) has shown that markedness facts can outweigh frequency patterns in acquisition/production
  - E.g most marked and most frequent [st] cluster acquired after the less marked and less frequent [sn] and [sl]

Cardoso (2007); Cardoso et al. (2007)

SYLLABLES: PERSIAN
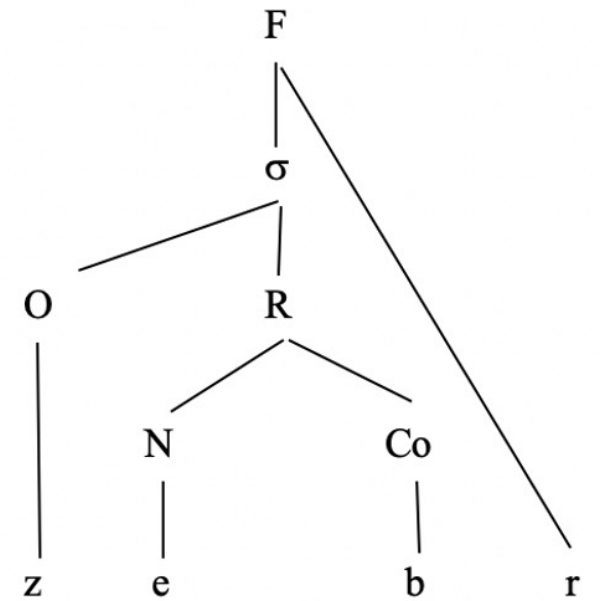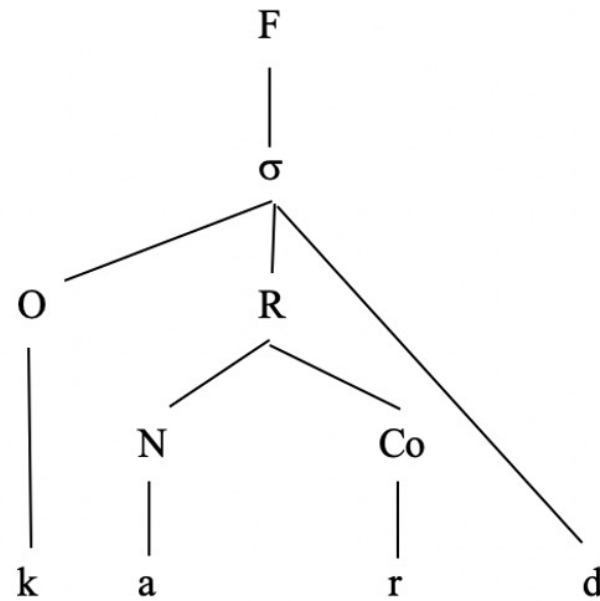
SYLLABLES: SAUDI ARABIC
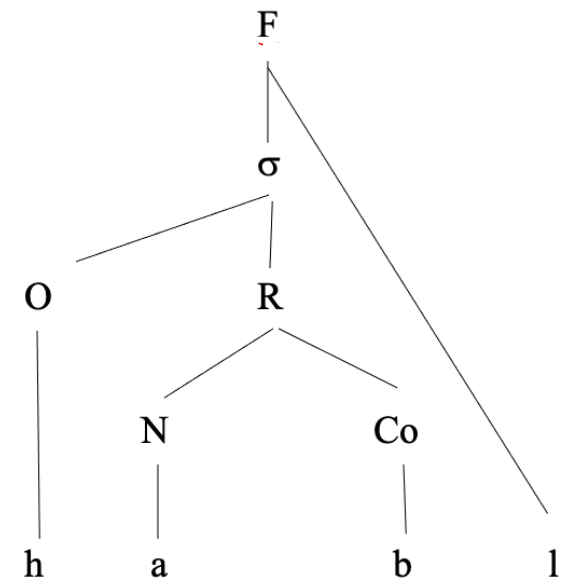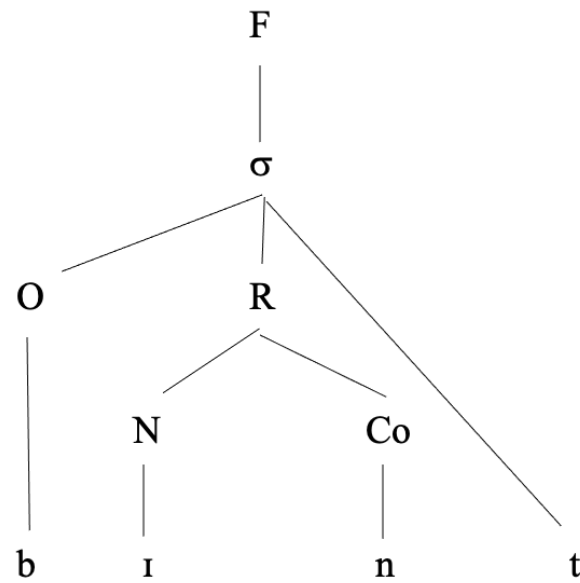
ENGLISH s+C SEQUENCE
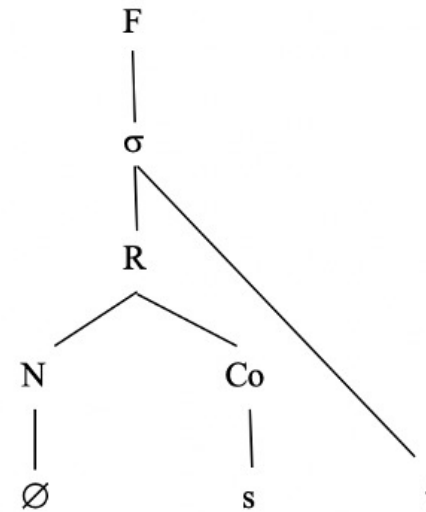
SYLLABIC REPAIR

- Adding vowels in production (*epenthetic* vowels)
  - E.g. borrowings
    - [e]smoking
    - besubaru
- Adding vowels in perception (*illusory* vowels)

ILLUSORY VOWELS

L1	sC Onsets	Branching Onsets	Appendices	% Errors
Japanese	No	No	No	72
Thai	No	No	No	60
Brazilian Portuguese	No	Yes	No	50
Persian	No	No	Yes	14
Hijazi Arabic	No	No	Yes	10
Najdi Arabic	No	Yes	Yes	7

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- L1 right-edge appendices facilitate acquisition of L2 left-edge appendices
  - redeployment

- And we don't *hear* appendices

Archibald (2005)

METRICAL FEET

Metrical feet are hierarchical
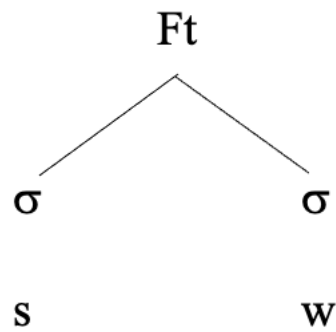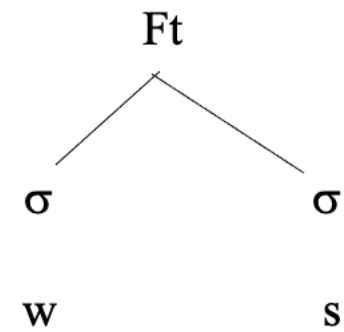
METRICAL FEET

From Archibald to Özçelik (alpha to ömega)

	Spanish	Polish	Hungarian	English
P1 (word tree)	right	right	left	right
P2 (foot type)	binary	binary	binary	binary
P3 (strong on)	right	right	left	right
P4 (built from)	left	left	left	left
P5 (Quantity-sensitive)	yes	no	yes	no
P6 (sensitive to)	rhyme	NA	nucleus	rhyme
P8 (extrametrical)	yes	no	no	yes
P8A (extrametrical on)	right	NA	NA	right

METRICAL FEET

- Stress is not a single thing to acquire

- Learners can reset their L1 parameters

- Directionality of difficulty effects
    - Hungarian CVV to English CVV + CVC = easy

        versus

    - English CVV + CVC to Khalkha Mongolian = difficult

- Positive evidence versus negative evidence

Archiald (1993); Özcelik (2022)
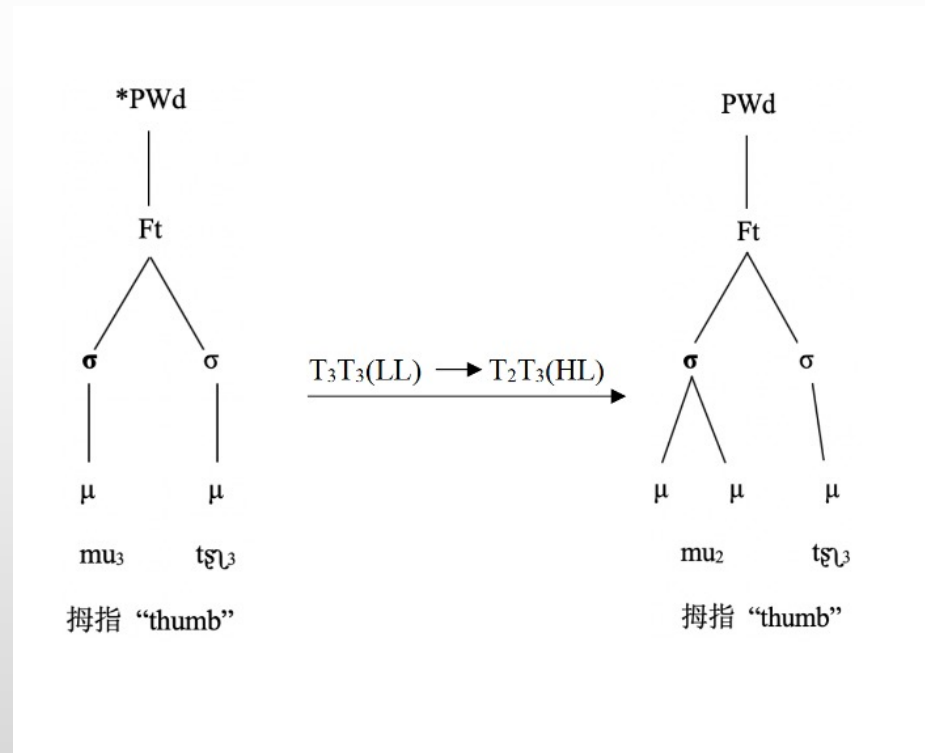
TONE SANDHI

- Comprehensibility of Mandarin and Cantonese heritage learners of Mandarin plus L2 and L3 learners

- L1 footedness predicted better comprehensibility scores (p<.05)

- No HL phonological advantage
  - MandarinHLs = L2ers on sandhi & non-sandhi words

- CantoneseHLs < L2ers on sandhi words but not on non-sandhi words
  - Implicates foot structure (as Cantonese lacks metrical feet (Chen, 2000)

HERITAGE LEARNERS

- Purported 'phonological' advantages (Polinksy, 2015) are mainly phonetic (VOT, etc.)

- Actual *phonology* is patterning with morphosyntax

INTERFACES

PHONOLOGY/MORPHOLOGY

- L2 German plural allomorphy shows the explanatory power of universal phonological representational constraints to explain learner behaviour

Archibald (in press)

WUNDERLICH'S DILEMMA

- Variable umlauting:
  - Thron ➤ Thron[ə] (throne)
  - Sohn ➤ Söhn[ə] (son)
- Variable suffixing:
  - Mund ➤ Münd[ɐ] (mouth)
  - Bund ➤ Bünd[ə] (federation)

- Plural -n cannot co-occur with umlaut
  - Pat[ə] ➤ Pate-n/*Päte-n (godparents)
- But non-plural -n can:
  - But Laden (store) ➤ Läden (stores)

An inductive challenge

Archibald (in press)

GERMAN PLURAL ALLOMORPHS

- There is only a single [+pl] affix ↔

  •

  |

  [COR]

- [+pl +fem] ↔ [NASAL]

(Trommer, 2018)

Coronal Consonant	Coronal Vowel
CPlace | [COR] | [n]	CPlace | VPlace | [COR] | [i]

Archibald (in press)

L2 LEARNERS

- Will they produce umlaut]$_{Root}$ + -n?

- If so, they might be violating phonological universals (see also Özçelik & Sprouse, 2016)

Würste. + {+Pl}	Wurste + {Pl}	*Würste + {+Pl}
VP1 •	•	VP1. •
	CP1	CP1
[COR]	[COR]	[COR]
[ü]	[n]	[ü] [n]

Archibald (in press)
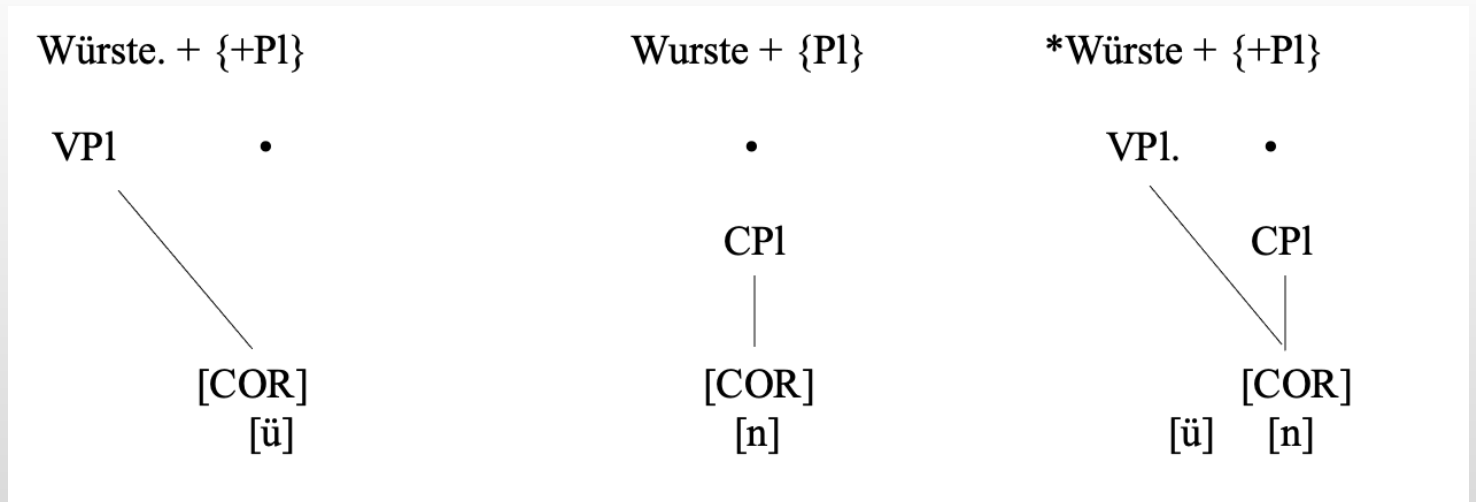
	T1	T2	Totals
Subjects	87	67	154
Test Items	522	469	991
Correct	292	239	593
Type A Error	225 (43%)	71 (15%) 159 (33%)	296 (30%) 159(16%)
Type B Error	5	2	7

Written production

	Observed N	Expected N	Residual
Type A	296	151.5	144.5
Type B	7	151.5	-144.5
Total	303		

Chi-Square	275.64
df	1
Asymp. Sig.	.000

- It is not the case that 'they don't produce things they don't hear, and they never hear umlaut+n'. They hear it, just not in plurals.

- Rather 'they don't produce illegal structures that they don't hear but they produce legal structures that they don't hear'

NO IMPOSSIBLE GERMAN GRAMMARS

- Poverty of the stimulus
- Not induction
  - Acoustic cues of umlaut and [n] are very different
  - 'Sometimes I hear umlaut' (e.g., *Würste*)
  - Sometimes I hear -[n] (e.g. *Suppen*)
  - I never hear umlaut AND plural -[n]
       but I hear umlaut + [n] in Roots

- Certainly not taught in class

- Representational constraints on possible grammars

L2 INFIXING

- English has infixing?

- Well, yes it does

- Get ready for some profanity (trigger warning)

- fan-fucking-tastic

- *fantas-fucking-tic

- Well-formedness based on foot structure

X   [Y]$_\Sigma$
1   2   → 1 EXPLETIVE 2

a.   *fan   ta   fuck ing stic.

b.   *fa fuck ing ntas tic

c.   fan fuck ing ta. stic

Recursive
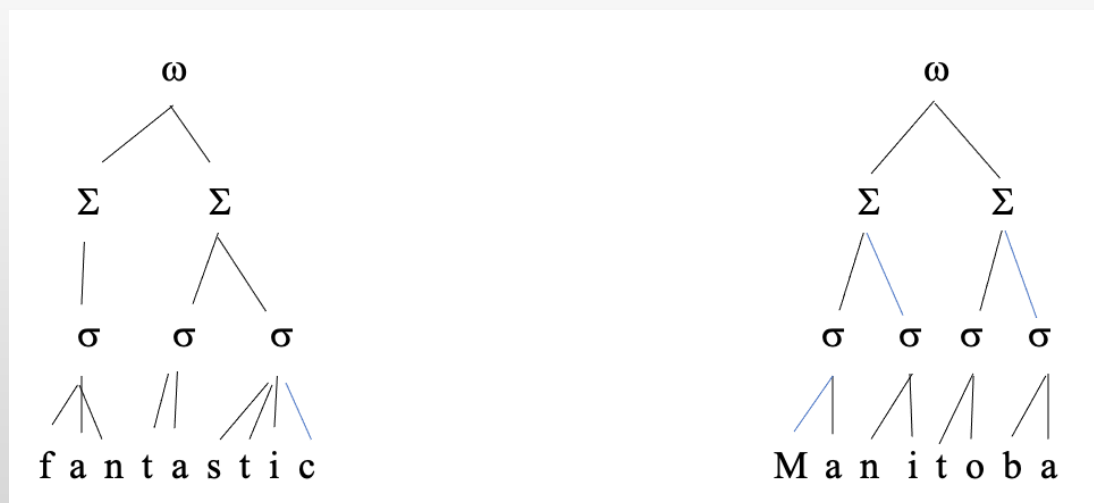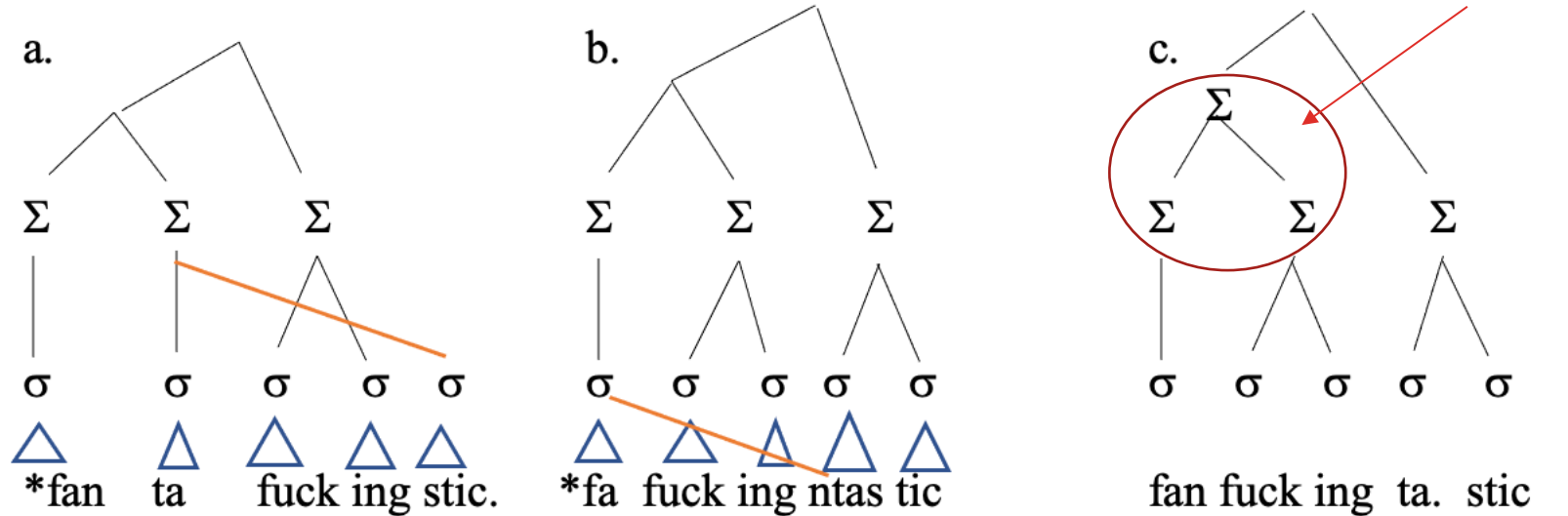
L2 INFIXING

- Feet are part of grammars
- And therefore part of what is acquired in LxA

- These infixes are low-frequency (SUBTLEX$_{US}$ and COCA), and not taught in class

L2 INFIXING

1. Abbotsford
2. Adventure
3. Amalgamated
4. Basketball
5. Burnaby
6. Celebrate
7. Coquitlam
8. Everybody
9. Fantastic
10. Garibaldi
11. Hypocrite
12. Identical
13. Information
14. Irresponsible
15. Kindergarten
16. Mississauga
17. Nanaimo
18. Pollution
19. Saskatoon
20. Scarborough
21. Texas
22. Unbelievable
23. Vancouver
24. Watermelon
25. Winnipeg

L1s:

   Mandarin: 19
   Quebec French: 16
   Spanish: 13
   Japanese: 49
   Controls: 12

Which of the following forms do you prefer (auditory LDT):

   fan-fucking-tastic
   fantas-fucking-tic

L2 INFIXING

Spanish	Quantity-sensitive trochees for stress
Mandarin	Weight-sensitive trochees for tone sandhi and stress
Japanese	Weight-sensitive trochees for loan word pitch accent
French	No feet
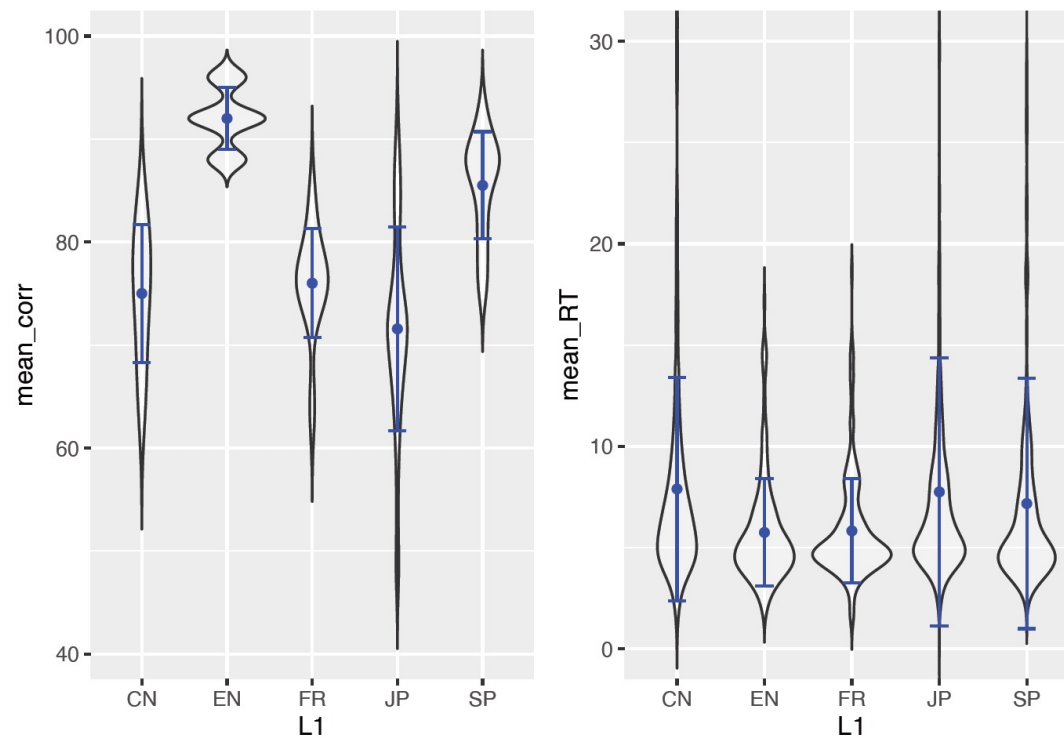
L2 INFIXING
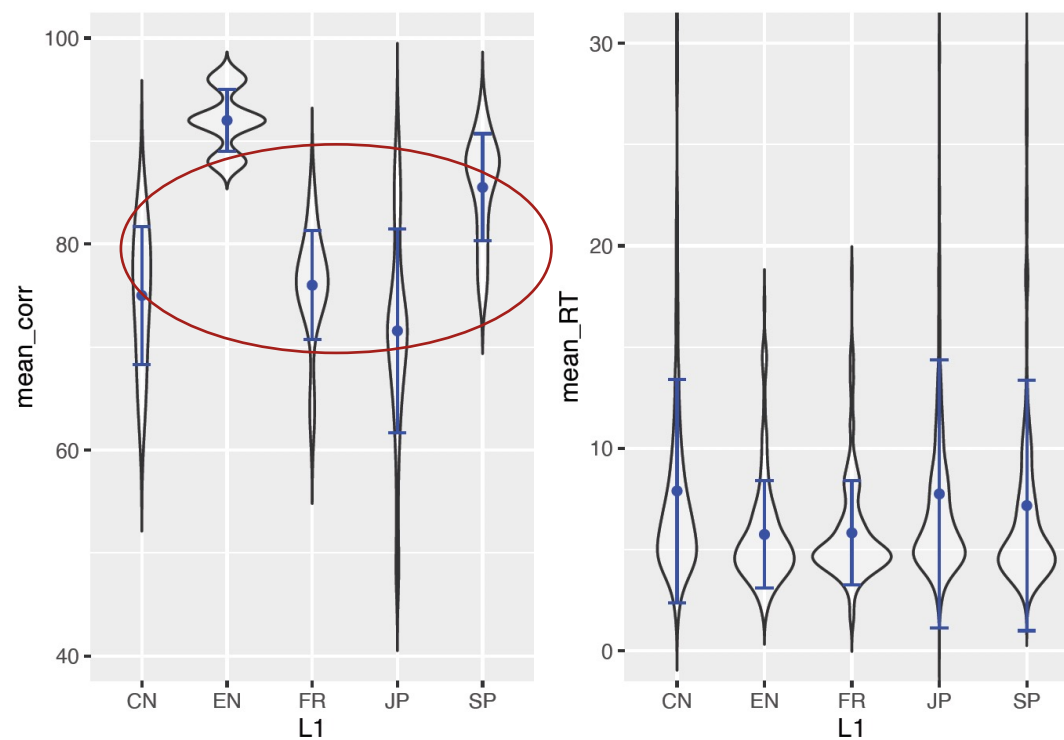
L2 INFIXING
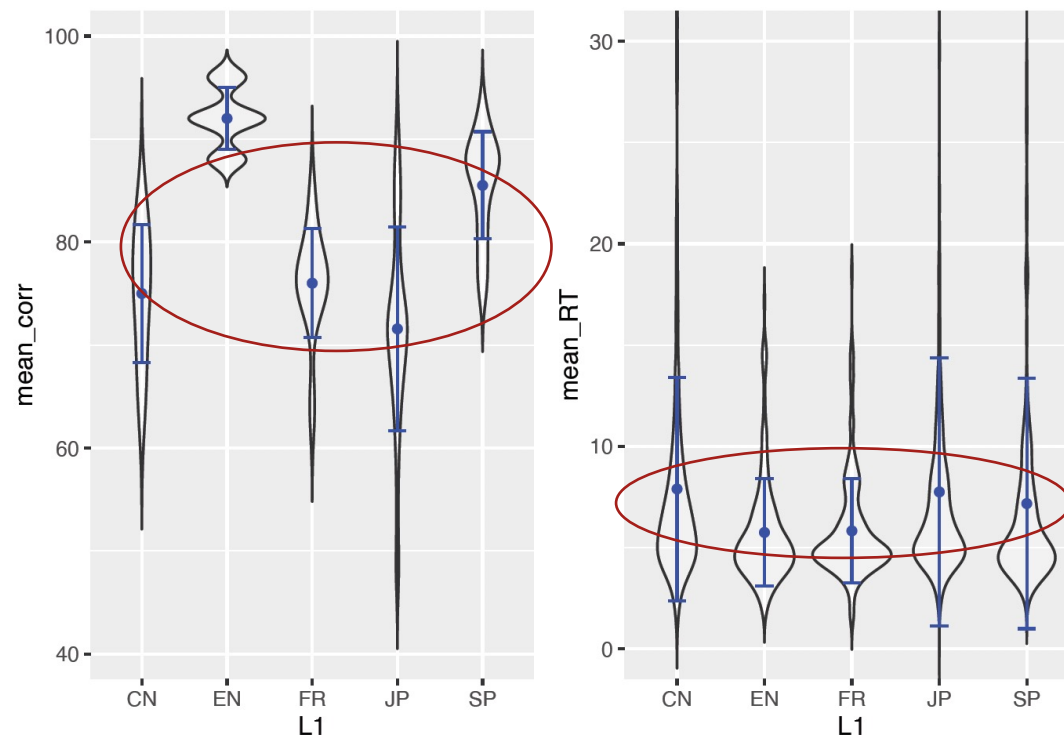
L2 INFIXING

Q1 Estimates
Are the L2 speakers less accurate than native English speakers?
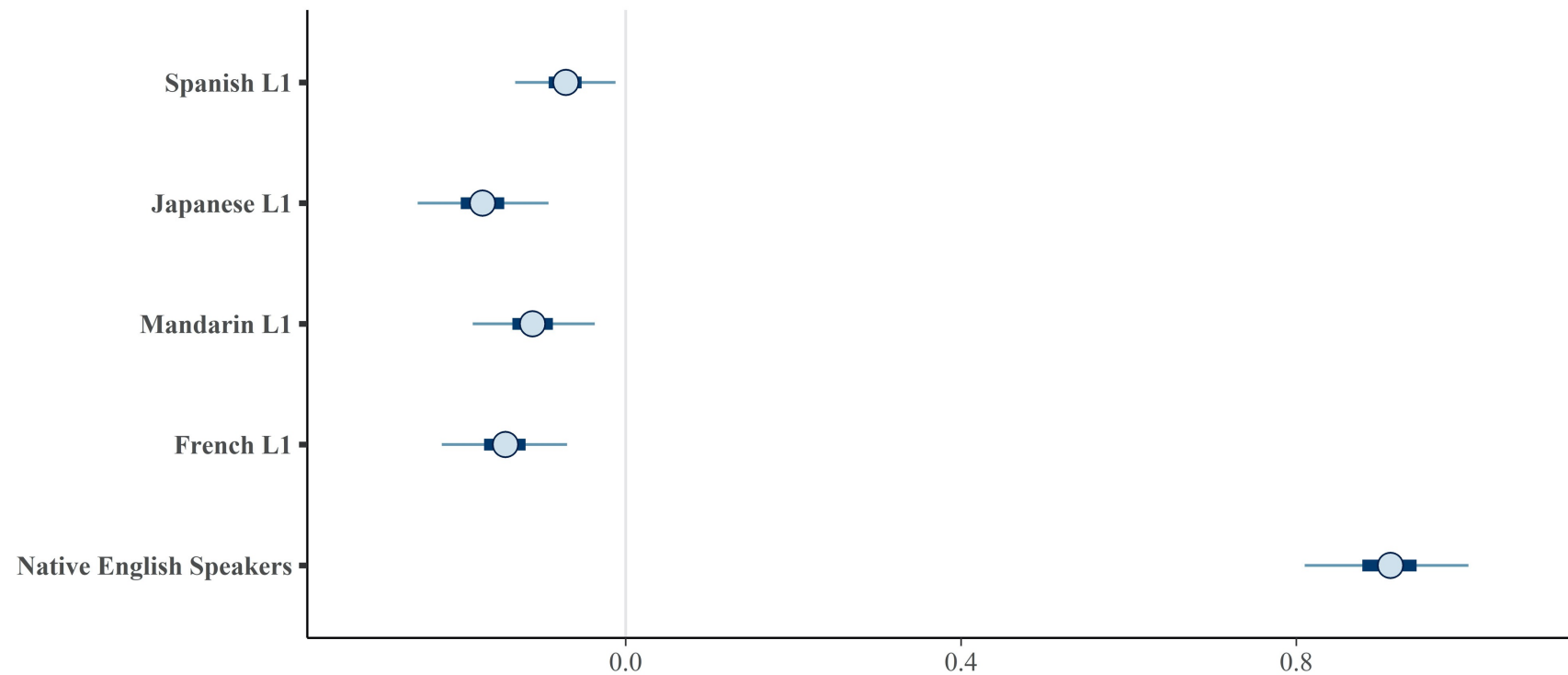
L2 INFIXING

Q2 Estimates
Are the Spanish L1 speakers more accurate than the other L2 groups?
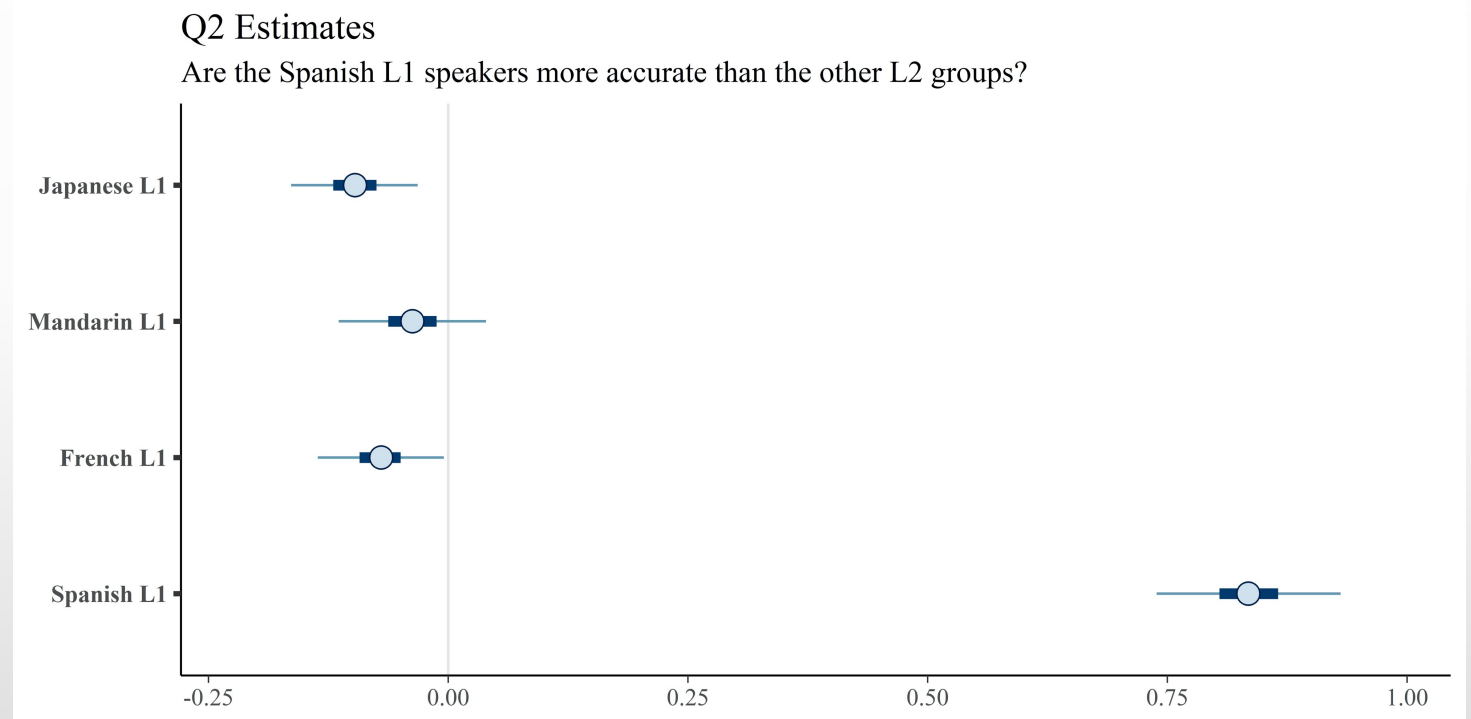
Accuracy rates consistent with recursive structures.

PHONOLOGY/SYNTAX

PHONOLOGICAL CONTIGUITY

- L2 learners of Japanese grammars are constrained by universal principles such as *contiguity* (Richards, 2016) and *Match Theory* (Elfner, 2015).

- Languages have two strategies for forming WH questions:

- **English** (Movement):   **Whom** should Bob call?
- **Japanese** (*in situ*):   Mito ga   **nani o**   katta   no?

    Mito-Nom what-Acc   bought +Q

    'What did Mito buy?'

- Richards (2010, 2016) argues that these are two strategies to achieve *contiguity*;

(a)   **English**: linear contiguity of C (+Q) and WH

(b)   **Japanese**: (i) phonetic boost on the WH element, and

(ii) lack of prosodic boundaries between WH and +Q in sentences

i.e. Phonological contiguity

- Do advanced L2 speakers have a phonological grammar with:

    (1) no prosodic boundaries between the WH word and the Question complementizer [(+Q]) to properly license WH *in situ*?

    (2) a pitch boost on WH phrases?

- 1) Naoya wa **nani** o *nomiya de nonda* no?
  ナオヤは、何を飲み屋で飲んだの？
  What did Naoya *drink at the bar?*

- 2) Naoya ga **nanika** o *nomiya de nonda.*
  ナオヤが、何かを飲み屋で飲んだ。
  Naoya *drank* **something** *at the bar.*

PITCH BOOST

- A range of statistical tests (Paired t-tests (p=0.475), GLMM, all showed that there was *no* significant difference between the pitch on WH words and the pitch on DPs.

⊞ **Table 1.** WH vs DP pitch levels (in semitones) by sentence pair.

Sentence Pair	Object	Average pitch (sd)	Average difference in pitch (95% CI)	Significance from paired t-test
1	DP	12.98 (6.79)	-0.80 (-2.57, 0.97)	p=0.349
	WH	12.18 (7.65)		
2	DP	13.59 (6.55)	-0.04 (-1.17, 1.08)	p=0.935
	WH	13.54 (7.10)		
3	DP	11.16 (6.65)	-0.90 (-2.36, 0.56)	p=0.207
	WH	10.26 (6.44)		

PHONOLOGICAL CONTIGUITY

Table 4. Sentential pitch patterns.

Sentence	Word1	Word2	Word3	Word4
1	nani-o	nomiya-de	nonda	no
2	nani-o	mottekita	ndesu	ka
3	dare-ga	nani-o	kaimasita	ka
4	kino	nani-o	kaimasita	ka

Table 3. Pitch levels (in semitones) between WH and [+Q].

Participant number	nani-o WH	nomiya-de	nonda	no [+Q]
S1	5.94	0.511	1.33	5.82
S15	20.5	15.3	15.3	17.83

Pitch Compression

Table 5. Results of linear mixed models for the comparison of Word1 and Word2.

Full Model	Estimate	Standard Error	t	p
(Intercept)	17.37	0.667	26.06	<0.001
Word2 vs. Word1	-1.65	0.685	-2.41	0.016
Proficiency (Advanced vs. Intermediate)	-0.13	0.916	-.14	0.888
Word2:Proficiency Advanced	0.21	0.941	0.22	0.823

Reduced Model	Estimate	Standard Error	t	p
(Intercept)	17.31	0.457	37.83	<0.001
Word2 vs. Word1	-1.54	0.469	-3.28	0.001

- The same was true of Words 2 & 3, and Words 1 & 3

Archibald & Croteau (2021)

(1) the L2ers have *not* acquired nativelike phonetic implementation of the documented pitch boost on WH words compared to non-WH DPs,

(2) the subjects *have* acquired the pitch compression patterns indicative of having no prosodic phrases intervening between the WH word and the question particle.

Interlanguage grammars are constrained by universal grammatical properties such as the prosodic contiguity of WH-phrase licensing.

- Argues against exemplar theory

  - If it was just about noticing and storing pitch patterns then the pitch boost and pitch compression should have behaved the same

L3 PHONOLOGY

- Much of the literature has been primarily on *phonetics*
  - Chen & Han (2019); Chen & Tian (2021); Llama & Cardoso (2018)
  - VOT, F1/F2

- There is a growing body of neurolinguistic literature to show that such phonetic facts stem from phonological representations (Cummings et al. 2021; Hestvik & Durvasula, 2016; Rhodes et al. 2022; Schluter et al. 2017)

L3 PHONOLOGICAL ARCHITECTURE

- Typological Primacy Model (Rothman)
    - Lexicon → Phonology → Morphosyntax

- Linguistic Proximity Model (Westergaard)
    - Parsing success

- We need representational models of comparision for phonology too

L3A

- L1A and L2A are not 'fundamentally different'
  - Full Transfer/Full Access
- L1A =L2A = L3A
  - But no Wholesale transfer into L3
- Why is this not a contradiction?
  - ~~Full Transfer~~, Full Access to a common L1/L2 repository will suffice

L3A

- López (2020) argues against a *separationist* framework of multilingual competence

- "a single linguistic competence grows out of the faculty of language on the basis of whatever ingredients the environment supplies. There are no two lexicons or two PFs."

- Multilingual competence is an 'integrated I-language'
  - MEG support in Phillips & Pylkkänen (2021)

L3A

- Here's the confluence:

  - •In L2A everything in the previous I-grammar is available for transfer

  - •In L3A as well, everything from the previous (integrated) I-grammar is available for transfer.

  - •Seen in this light, there is no fundamental difference between L2A and L3A

BROADER PERSPECTIVES

WIDENING CIRCLES

Cognition

Grammar

Society
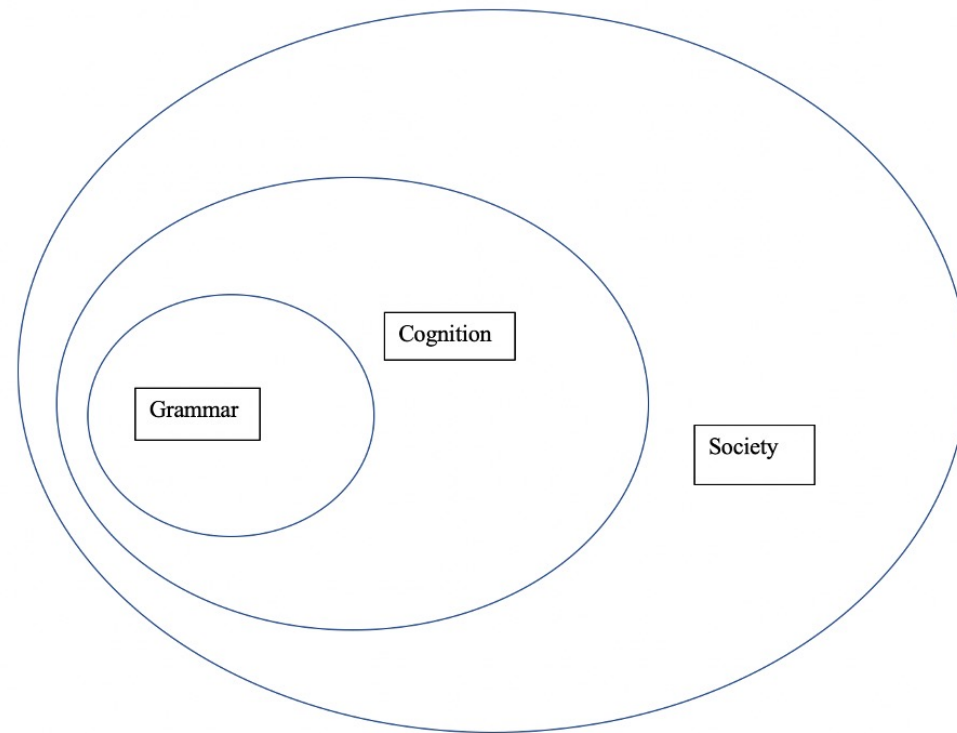
Channeling Kevin Gregg.

INTELLIGIBILITY

- Intelligibility of L2 speech traditionally has a functional definition in Applied Linguistics of *recovering the intended message*

- It can be viewed in the same way as monolingual processing research though
  - Word recognition
  - Ambiguous phoneme resolution

Research Topic

L2 Phonology Meets L2 Pronunciation

frontiers
in Communication | Language Sciences

- Ease & Difficulty in Learning and Teaching

Archibald, O'Brien & Sewell (2021)

TEACHABILITY

- Cardoso et al. (2021) on markedness and teaching
  - teaching the most marked phonological structure ([st]) generalizes to improved learner performance on the unmarked structures ([sn] and [sl])

Cardoso, Collins & Cardoso (2021); Archibald, O'Brien & Sewell (2021)

TRAINING

- High Variability Phonetic Training
  - Talker variability
  - Input enhancement

- Helps L2 learners re-weight phonetic cues
  - E.g. spectral and duration cues
  - Why?

- Phonology

Hayter & Archibald (submitted); Yuan & Archibald (2022)

PHONOLOGY AND VARIATION

- Phonological features have *marked* and *unmarked* values

Laryngeal

[+spread glottis]   (-spread glottis)

{p t k}   {b d g}

E.g., English

Laryngeal

[+voice]   (-voice)

{ b d g }   {p t k}
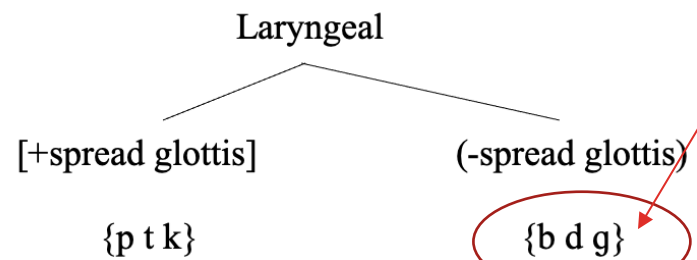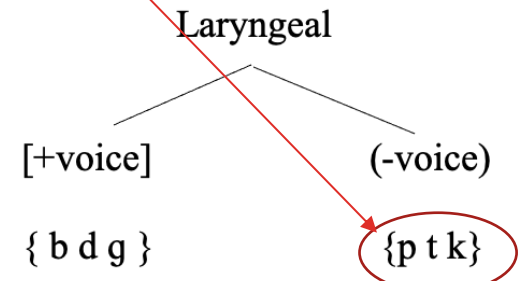
E.g. Russian

PHONOLOGY AND VARIATION

Greater variation

Laryngeal

[+spread glottis]   (-spread glottis)

{p t k}   {b d g}

E.g., English

Laryngeal

[+voice]   (-voice)

{ b d g }   {p t k}

E.g. Russian

Natvig & Salmons (2021); Archibald (2021)

PHONOLOGY AND VARIATION

Greater variation is the learning cue to the underlying feature

UNIFYING DEVELOPMENTAL PHONOLOGY

- L1A, L2A, L3A, Historical, Language Change

- +morphosyntax

SOCIAL JUSTICE

- In a world where inclusivity and diversity are valued, discrimination based on language is surprisingly widespread.

- We can see instances where particular regional or social dialects are stigmatized (often the dialects of marginalized populations).

- We can tackle this important issue of equity. Lx phonologies are not 'deficient', or 'shallow'. Rather, they are rich, complex mental representations
  - Even in the domain of *accent*

Group → 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
Period ↓

Period																		
1	1 H																	2 He
2	3 Li	4 Be											5 B	6 C	7 N	8 O	9 F	10 Ne
3	11 Na	12 Mg											13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
4	19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
5	37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
6	55 Cs	56 Ba	57 La *	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn
7	87 Fr	88 Ra	89 Ac **	104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Ds	111 Rg	112 Cn	113 Nh	114 Fl	115 Mc	116 Lv	117 Ts	118 Og

*	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu
**	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr

123
Ah!
[230]

The Element
of Surprise!

- L2 phonology is about much more than foreign accent. By understanding its role in the architecture of multilingual competence, we gain insight into the cognitive machinery of most of the brains on this planet.
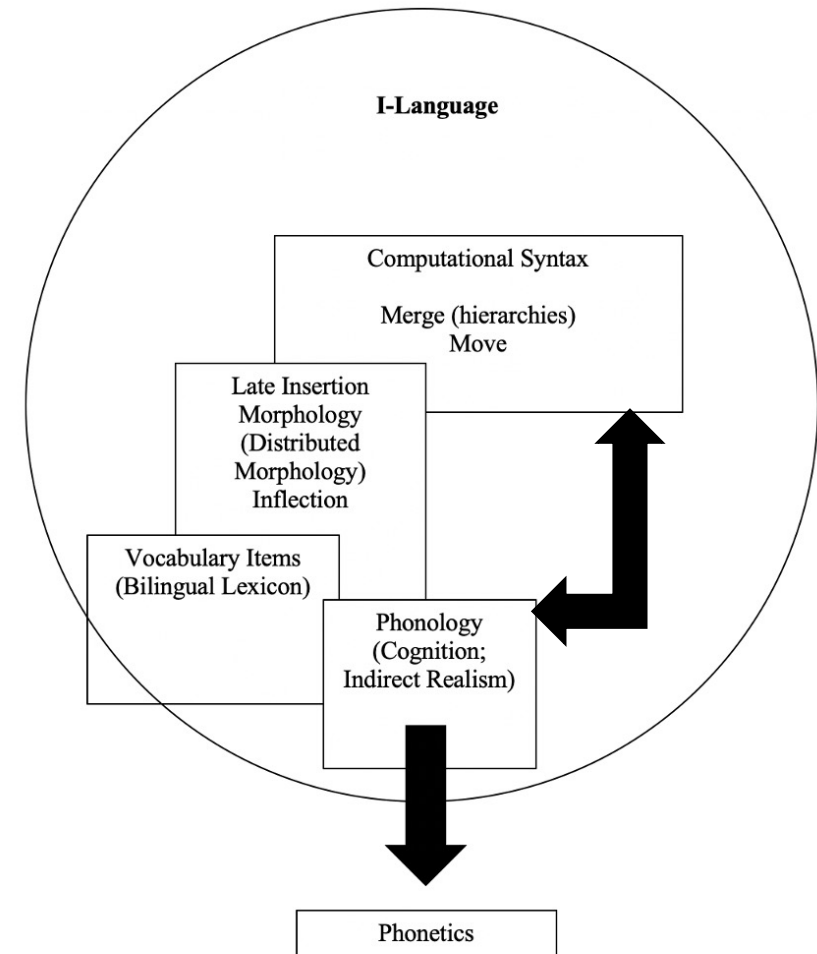
FACULTY OF LANGUAGE NARROW

"it has been suggested that only syntactic recursion is part of the narrow faculty of language … and that phonology is outside FLN. However, the contrastive hierarchy has a recursive digital character, like other aspects of FLN. Like syntax, phonology takes substance from outside FLN and converts it to objects that can be manipulated by the linguistic computational system."

Multilingual phonological grammars are:

Complex

Hierarchical

Recursive

UG-Constrained

Learned (not noticed)

The interfaces show us that phonology is *central* (not peripheral) to the multilingual cognitive architecture of the human language faculty

Phonology

Syntax

Morphology

Semantics
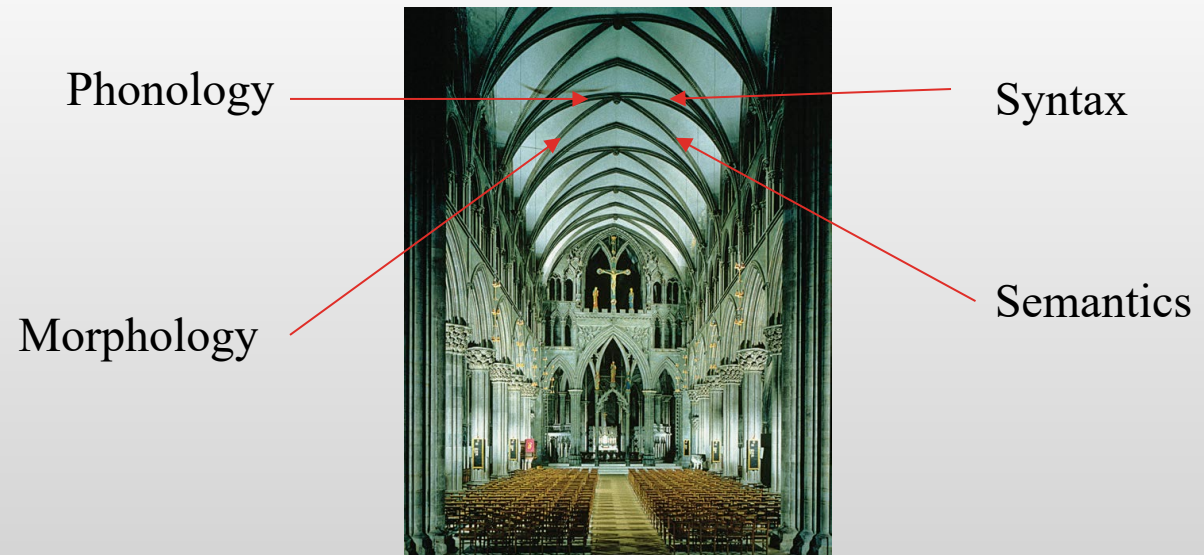
Thank you

johnarch@vic.ca

https://onlineacademiccommunity.uvic.ca/johnarch/
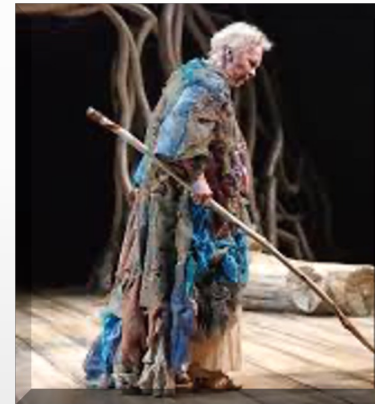
Amjad Alhemaid	Jie Deng	Daniel Hall	Su Urbanczyk
Eloisa Cervantes	Elan Dresher	Emma Hayter	Marziyeh Yousefi
Nicole Croteau	Peter Gölz	Mitchell Li	Junyu Wu
Martin Demarais	Antonio González Poot	Matt Pollard	Sophia Yuan

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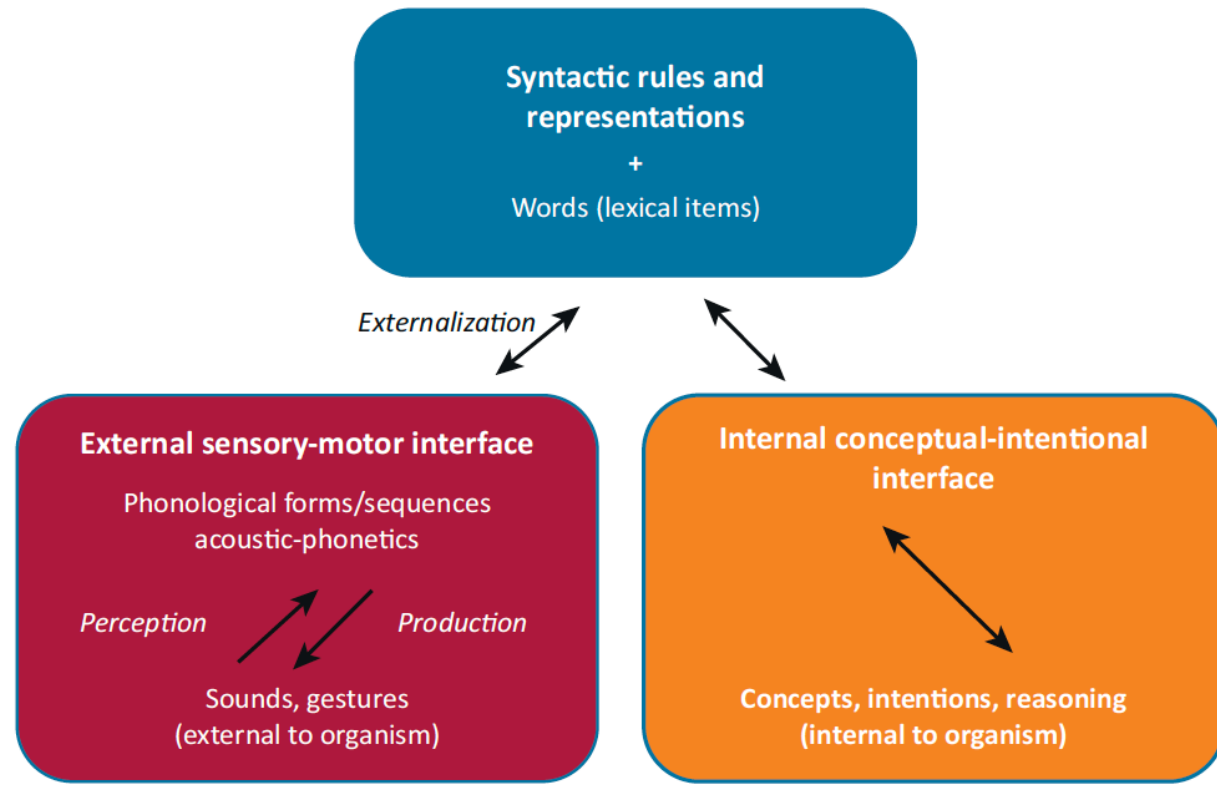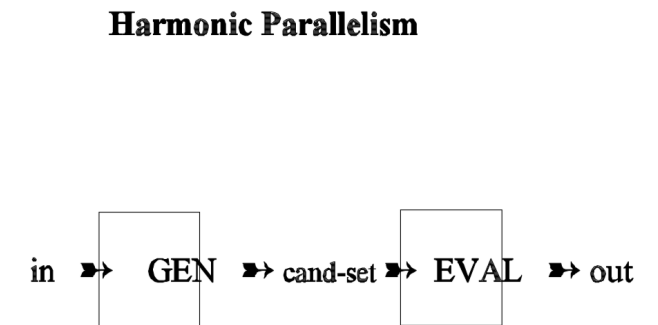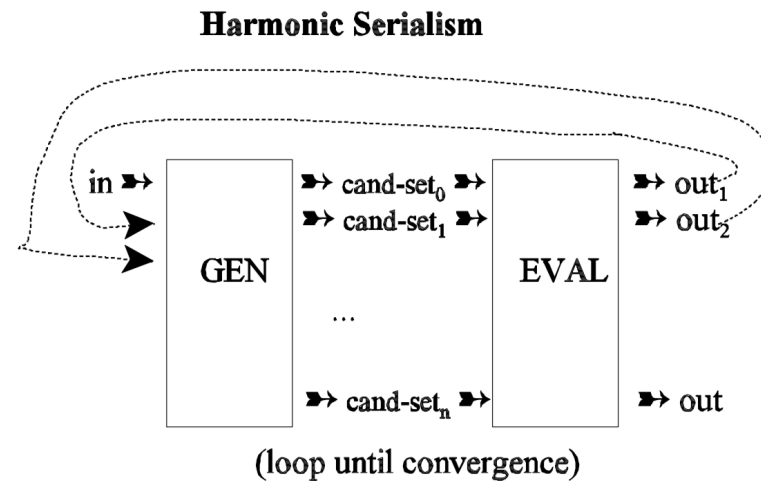
WHY IS L2 PHONOLOGY UNDERREPRESENTED?

- 30 years after key works in language learnability, L2 phonology remains (unlike morphology, syntax, and semantics) somewhat of an outlier in the GenSLA academic community.
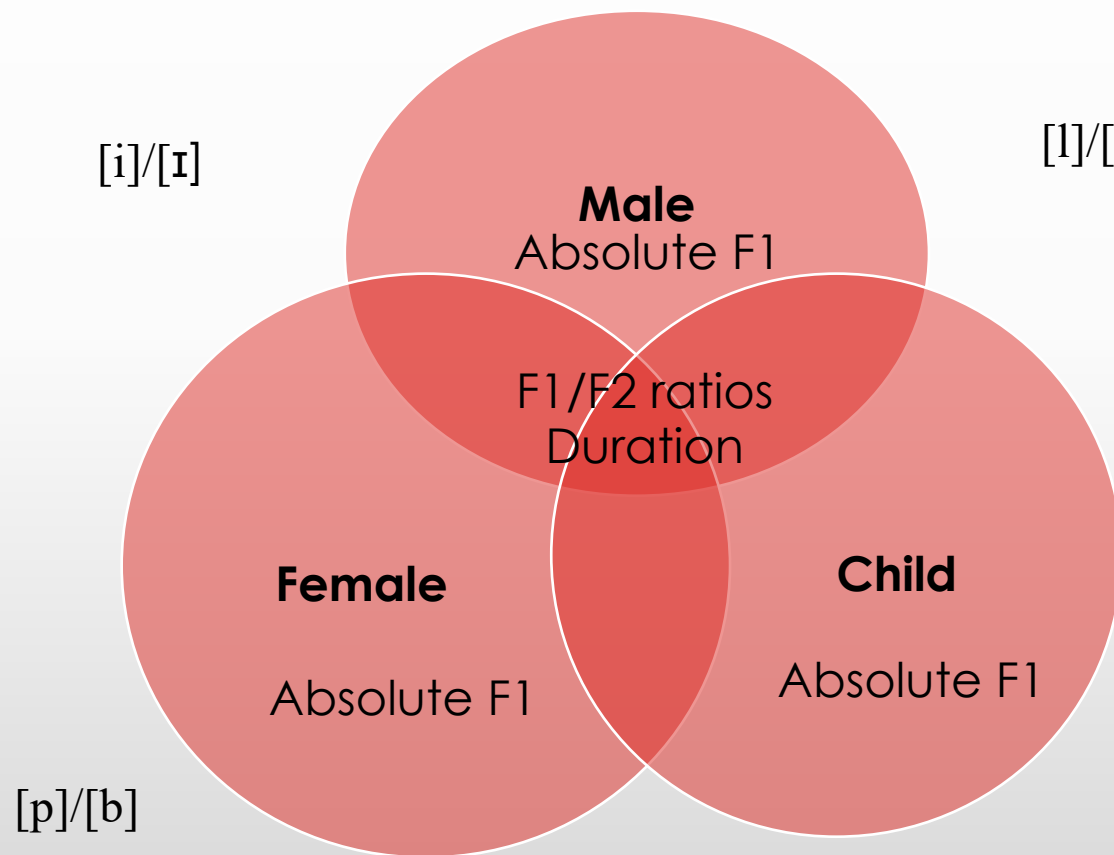
MINIMALIST ARCHITECTURE

COMPUTATIONAL PHONOLOGY

(1)   Serial and Parallel Architectures for OT

Harmonic Serialism

in ➤➤ | GEN | ➤➤ cand-set$_0$ ➤➤ | EVAL | ➤➤ out$_1$
➤➤ cand-set$_1$ ➤➤ | | ➤➤ out$_2$

...

➤➤ cand-set$_n$ ➤➤ | | ➤➤ out

(loop until convergence)

Harmonic Parallelism

in ➤➤ GEN ➤➤ cand-set ➤➤ EVAL ➤➤ out

The siren call of third factors, and neo-empiricism.

HVPT & PHONOLOGY

[i]/[ɪ]

[l]/[r]

Male
Absolute F1

F1/F2 ratios
Duration

Female

Absolute F1

Child

Absolute F1

[p]/[b]

Hayter & Archibald (submitted); Yuan & Archibald (2022)

PHONOLOGY & THE LEXICON

Interlingual Homophones	Interlingual Homographs
e.g. English/Dutch [lif] 'leaf'/ 'dear' -slower (inhibited) activation -don't share a semantic root -same spell out	e.g. English/Dutch "glad" [glæd]/[xlat] -faster activation -don't share a semantic root -different spell out (matched by letters, predictability, etc.)

Polysemes	Homophones
e.g. The *paper* was A4. The *paper* was owned by Rupert Murdoch. The *paper* was written by Jason. -faster activation -share semantic root -same spell out	e.g. He fell off the *bank* of the river. She opened a savings account at the *bank*. -slower activation -don't share semantic root -same spell out

Interlingual Allomorphs

e.g. √*dog* and √*chien*

-share semantic root
-different spell-out
-polysemy in bilingual speech context

Accuracy Rate	Lexical Items
>90%	hypocrite, Garribaldi, Winnipeg, celebrate, information, basketball, watermelon, everybody, kindergarten, Mississauga
>80%	Abbotsford, Scarborough, adventure, irresponsible, Vancouver, Saskatoon, fantastic
>70%	identical, pollution, Burnaby
50%-70%	Coquitlam, Nanaimo, unbelievable
<50%	amalgamated, Texas

Table 5. Accuracy rates for groups of lexical items.

Trial Number	Option 1	Option 2	Correct
1	Abbots-fucking-ford	Abb-fucking-otsford	1
2	Adven-fucking-ture	Ad-fucking-venture	2
3	Amalga-fucking-mated	Amal-fucking-gamated	1
4	Basket-fucking-ball	Bas-fucking-ketball	1
5	Burna-fucking-by	Bur-fucking-naby	1
6	Celebra-fucking-ate	Cele-fucking-brate	2
7	Coquit-fucking-lam	Co-fucking-quitlam	2
8	Eve-fucking-rebody	Every-fucking-body	2
9	Fantas-fucking-tic	Fan-fucking-tastic	2
10	Gari-fucking-baldi	Garibal-fucking-di	1
11	Hypo-fucking-crite	Hy-fucking-pocrite	1
12	Iden-fucking-tical	I-fucking-dentical	2
13	Informa-fucking-tion	Infor-fucking-mation	2
14	Irrespons-fucking-ible	Irre-fucking-sponsible	2
15	Kindergar-fucking-ten	Kinder-fucking-garten	2
16	Missi-fucking-ssauga	Missisau-fucking-ga	1
17	Na-fucking-naimo	Nanai-fucking-mo	1
18	Po-fucking-llution	Pollu-fucking-tion	1
19	Saska-fucking-toon	Sa-fucking-skatoon	1
20	Scar-fucking-borough	Scarbo-fucking-row	1
21	Tex-fucking-as	Te-fucking-exas	2
22	Unbelieve-fucking-able	Unbe-fucking-lievable	2
23	Vancou-fucking-ver	Van-fucking-couver	2
24	Waterme-fucking-lon	Water-fucking-melon	2
25	Winni-fucking-peg	Wi-fucking-nnipeg	1