

Morphological productivity in the acquisition of plural inflection in European Portuguese

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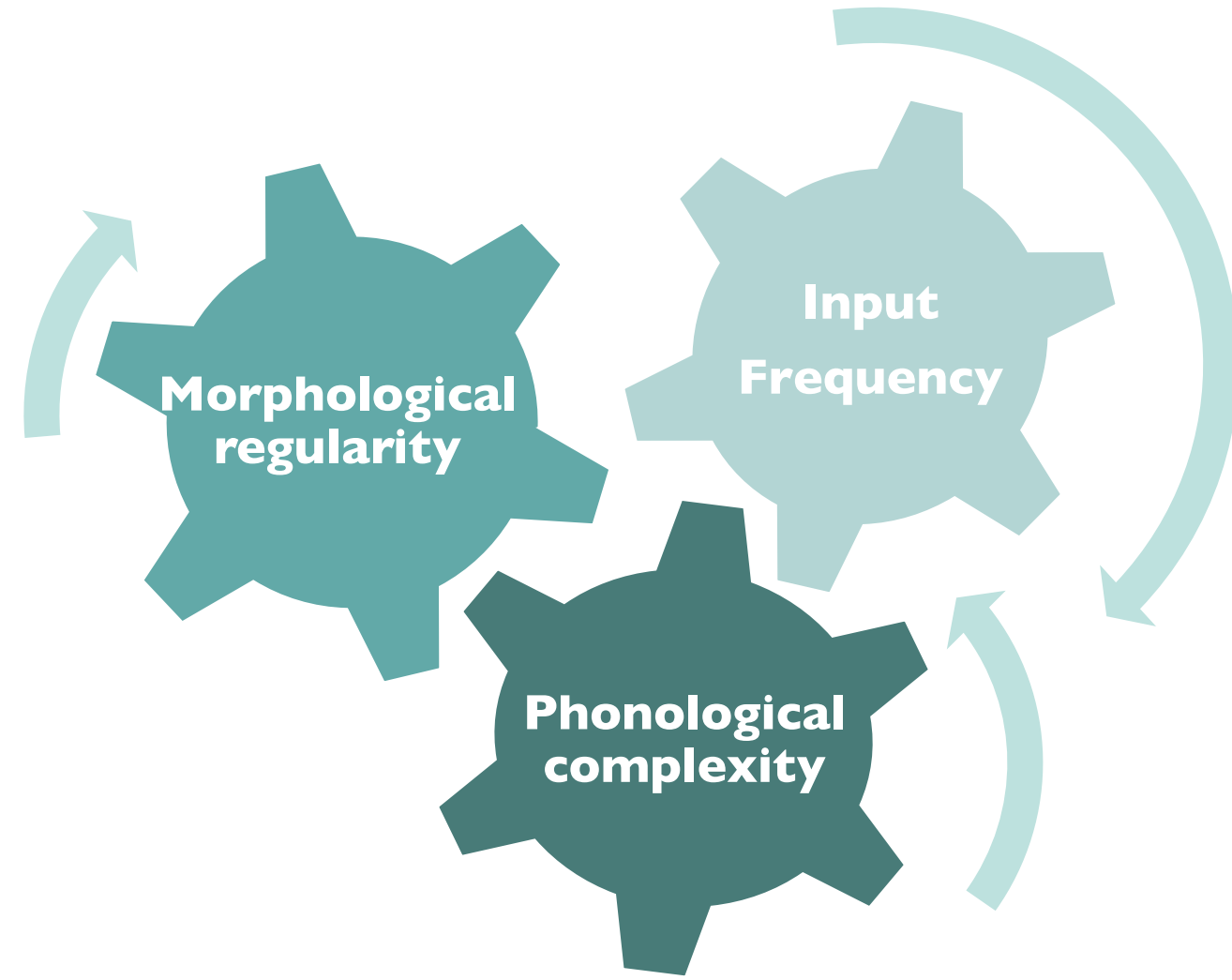


GALA 2025



TOURS

Plural inflection in European Portugal (EP)



It helps us understand how children learn and use inflectional rules.



Complexity in EP Plurals

→ General inflectional morpheme suffix ʃ

Regular

no morphophonological
alternation

menino● → meninos [mɛˈninuʃ]

Lateral codas [-Vl]

morphophonological alternation

[-aɫ] → [-ajʃ]

[-il] → [-iʃ]

canal → canais [kaˈnais]

funil → funis [fuˈnis]

Nasal diphthong [-ẽw̃]

(no) morphophonological alternation

three competing forms

[ẽw̃ʃ] [-õjʃ] [-ẽjʃ]

balão → balões [balõjʃ]

mão → mãos [mẽw̃ʃ]

cão → cães [kẽjʃ]

Regular plurals

Acquisition trajectory

Freitas (1997), Freitas, Miguel & Faria (2001), Gonçalves (2004), Ramalho (2010), Castro (2010), Ramalho & Freitas (2012)

Children demonstrate sensitivity to number morphology by age 2 (comprehension), and regular plural forms are generally mastered by age 4–5 (production).

Plural marking in nouns is acquired early in European Portuguese, typically well before age 5, depending on the nominal pattern.

Lateral codas [l] plurals

Morphophonological processes

[-al, -el, -ol, -ul]

When the vowel before [l] is not [i]

Result: [j] + [ɫ] = **oral diphthong** + [ɫ]

[il]

When the vowel before [l] is [i]

Result: [j] merges with [i] + [ɫ]
vowel/glide fusion

Lateral codas [l] plurals

Acquisition trajectory (test items: words)

	Freitas & Afonso (2017)	Zhou & Freitas (2025)
Question	What happens in acquisition?	Why does it happen?
Method	75 children (4;0-6;0) elicited production	Computational modeling (OT & HG)
Key Finding	-il plurals are significantly harder Main error: [-lɪs] (86%) cf. amor - amores	-il needs two (phonological) changes: • /l/ → [j] (gliding) • [ij] → [i] (fusion) • Others need only one: • /l/ → [j] (gliding)
Contribution	Documents the phenomenon	Reveals why -il is harder: coordinating 2 processes = more complex

Nasal diphthong [ɫ] plurals

– ãos [ẽw̃ʃ]

+ ʃ (general rule)

Applies to all
paroxytones, tonic
monosyllable and some
oxytones

– ões [-õjʃ]

+ ʃ (general rule)

**morphonological
alternation of the
diphthong** (V+glide)

Applies to the majority of
nouns ending in [-ãõ], and
augmentatives

– ães [-ẽjʃ]

+ ʃ (general rule)

**morphonological
alternation of the
diphthong** (V+glide)

Applies to a small, fixed
set of words



Nasal diphthong [ɫ] plurals

Input frequency

Spoken Portuguese corpus – CPF

	total	palavras n=136.105	plurais de nomes em <i>-ão</i> n=281
-ãos	26	0.019%	9.3%
-ães	18	0.013%	6.4%
-ões	237	0.174%	84.3%

Child Directed Speech corpus – CDS

	total	palavras n=167.996	plurais de nomes em <i>-ão</i> n=142
-ãos	28	0.017%	19.7%
-ães	17	0.010%	12.0%
-ões	97	0.058%	68.3%

ões > aos > aês

(source: FrePOP, in Castro, 2010)

Nasal diphthong [ɫ] plurals

Acquisition trajectory (test items: words and pseudowords)

Study	Sample	Ages	Key finding
Castro (2010)	40 children 10 per group + 15 control adults	2-5 yo + adults	• 2-3 yo: overgeneralization (-ãos) • 4 yo: shift to -ões • 5 yo: high variability
Ramalho (2012)	130 children 32 per group	3-7 yo	• confirmed Castro (2010) pattern • extended through school age with increasing stability

Castro: "Regression" at age 5 (from 65% to 40% -ões)

Ramalho: Continued progression at age 5 (53% -ões)

Both: High variability at age 5

Complexity in EP Plurals

→ General inflectional morpheme suffix ɹ

Regular

no morphophonological
alternation

Lateral codas $[-\text{VI}]$

morphophonological alternation

$[-\text{a}l] \rightarrow [-\text{a}j\text{ɹ}]$

$[-il] \rightarrow [-i\text{ɹ}]$

Nasal diphthong $[-\text{ẽw̃}]$

(no) morphophonological alternation

three competing forms

$[\text{ẽw̃}\text{ɹ}]$ $[-\text{õ}\text{ɹ}]$ $[-\text{ẽ}\text{ɹ}]$

Three cases:

- representative of EP morphophonological complexity
- sufficient for assessing morphological maturity
- cover early to late acquisition patterns

What makes a pattern productive?

Patterns	Frequency	Reliability	Productivity
Regular	↑	↑	Productive
Lateral coda	↓	↑	
[-aɫ] → [-aɟʃ]	↑	↑	Productive
[-iɫ] → [-iʃ]	↓	↑	Productive
Nasal diphthong	↓	↓	
[ẽw̃ʃ] → [-õjʃ]	↑	↓	Productive
[ẽw̃ʃ] → [ẽw̃ʃ]	↓	↓	Non productive
[ẽw̃ʃ] → [-ẽjʃ]	↓	↓	Non productive



Questions

Default (+ ʃ)

Do children already show near-ceiling productivity with [-ʃ] at kindergarten?

Structured competition
Lateral codas

When /l/→[j] interacts with a preceding vowel, do children show systematic patterns that line up with the natural competitors ([ilɪsʃ] / ([iʃ] , ([alɪsʃ] / ([aɪʃ]) rather than random noise?

Confidence vs. competition
Nasal diphthong

With three competitors [ẽw̃ʃ] [-õjʃ] [-ẽjʃ] do children move from early [ẽw̃ʃ] to the productive [-õjʃ] , with [-ẽjʃ] confined to lexical “pockets” at kindergarten?

Cross-pattern links

Do the same children who are “near-adult” in one pattern also stabilize in others?



Methods

Test of Morphological Knowledge

(Miguel, Cadime & Lobo, 2024; in prep.)

- Sample collection conducted individually in school settings
- Evaluators: Speech and language therapists, familiar with the test and the institutions

Participants

200 typically developing EP children

Mean age	6;0 (SD = 0.26 years)
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Age range	5;5 – 6;6
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Sex	F 99 (49.5%) · M 101 (50.5%)
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Control group

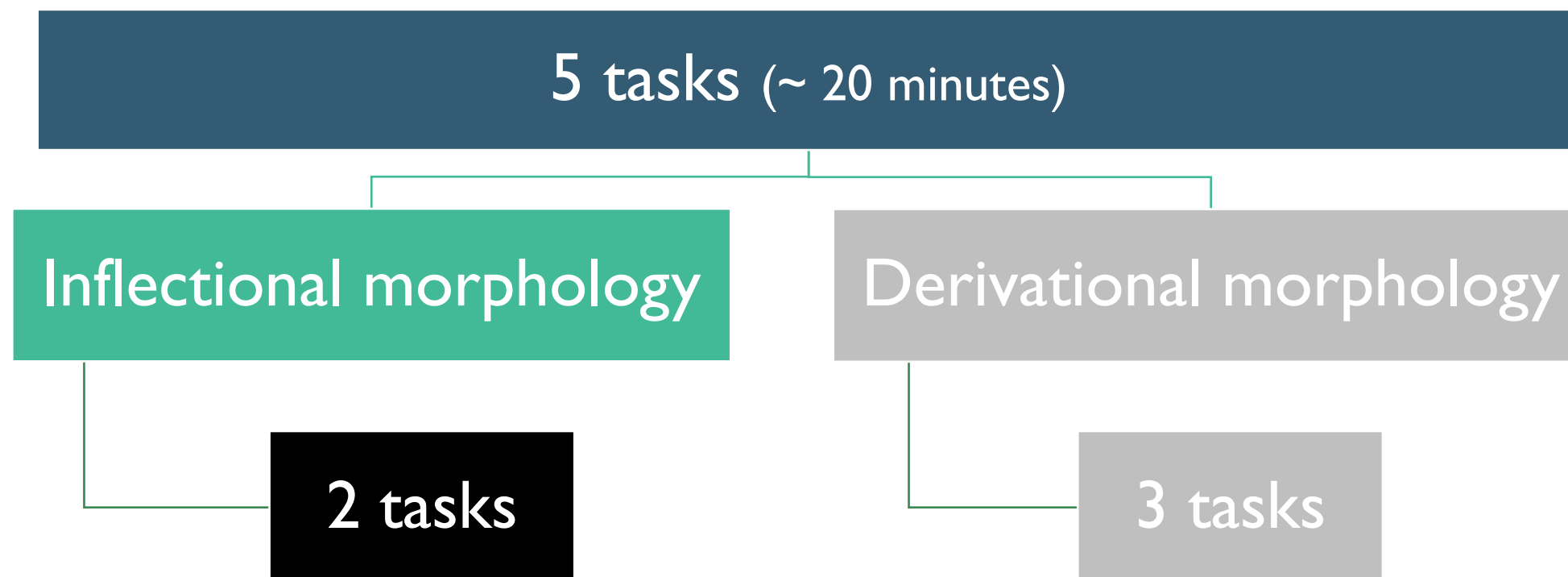
40 adults

23-40 years old (M=30y; SD= 3y)

Methods

Test of Morphological Knowledge

(Miguel, Cadime & Lobo, 2024; in prep.)





Methods

Pseudonominal inflection task

- **Elicited production tasks** – wug test
- **3 items per pattern**
- **Total: 12 items** (masculine non animated)

Regular – **u**

Nasal diphthong – **ẽw**

Lateral + low vowel – **al**

Lateral + high vowel – **il**

Methods

Pseudonominal inflection task

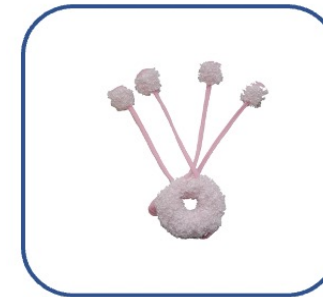
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Regular – **u**

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Lateral + high vowel – **il**



This is a “Lifu”.
Este é um “Lifu”.

Methods

Pseudonominal inflection task

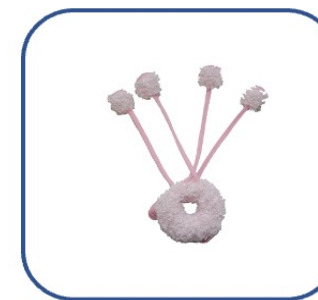
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Regular – **u**

Nasal diphthong – **ẽw**

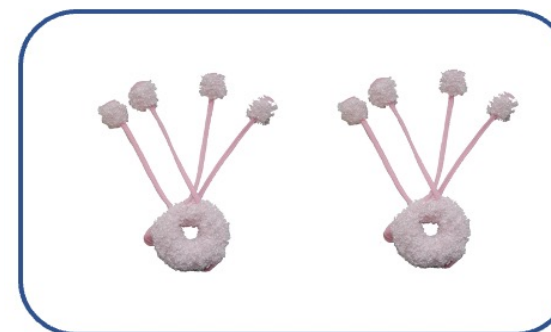
Lateral + low vowel – **al**

Lateral + high vowel – **il**



This is a “Lifu”.

Este é um “Lifu”.



Now there are two.

There are two ____.

Agora são dois.

São dois ____.

Methods

Constraint: only 3 items per pattern (clinical feasibility)

Still valuable: 200 children × pseudowords = window into productivity

Exploratory focus

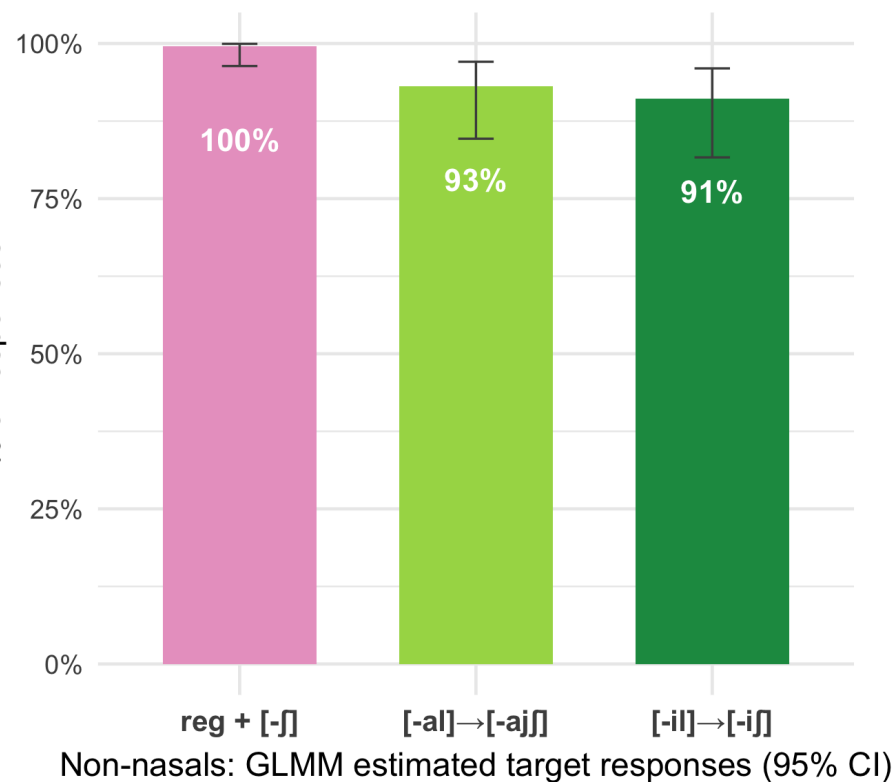
- Describe typical performance at 5–6 years
- Which patterns are mastered (adult like, above 90%)?
- Which ones are more challenging?

Methods

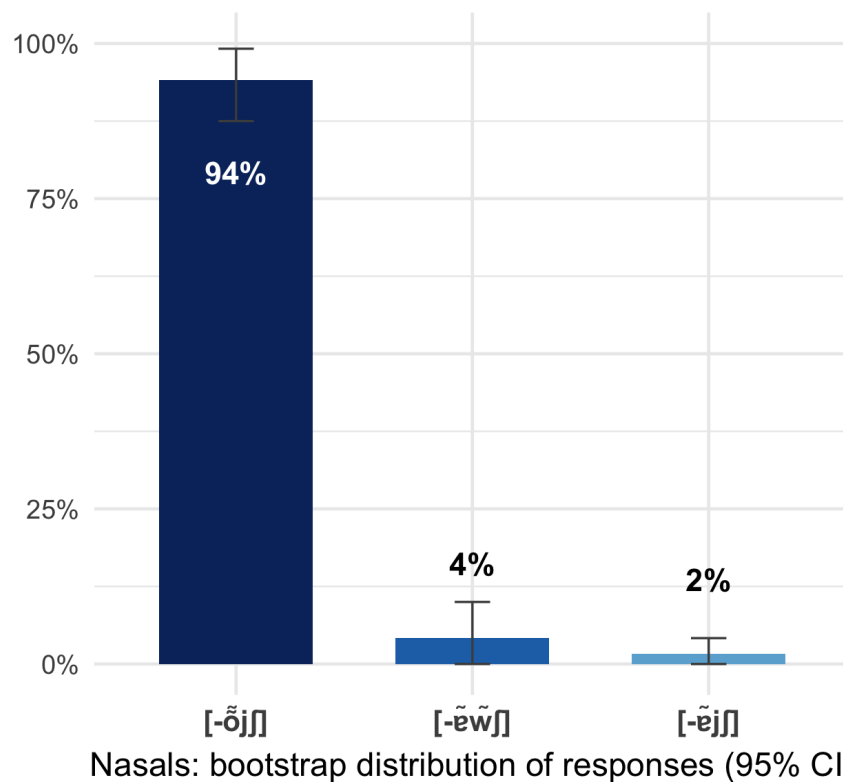
Adult baseline + grammar = scoring targets

Adult baseline response production

Non-nasals



Nasals



Regular

[-] categorical ($\approx 100\%$)

Laterals

[-aj], [-i]

less categorical than expected

Nasals

[-õj] ($\approx 94\%$)

[-ẽj], [-ẽw̃] marginal

Results broadly confirm grammatical descriptions.



Methods (scoring)

Regular

target [-ŋ]

Laterals

-al

target

[-ajŋ]

regularized

[-alisŋ]

-il

target

[-iŋ]

regularized

[-ilisŋ]

Nasals

target

[-õj~ŋ]

regularized

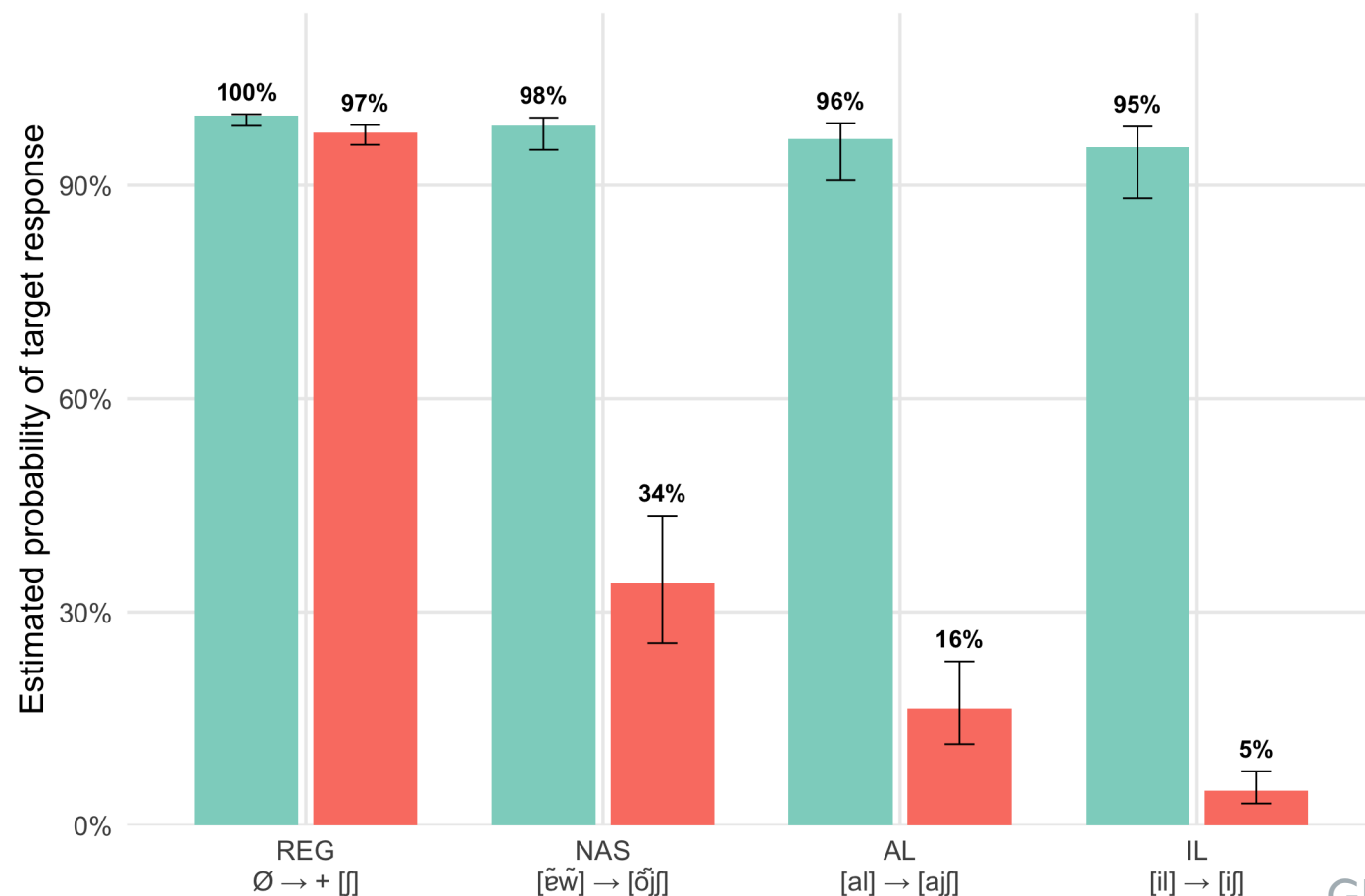
[-ẽwŋ]

lexicalized

[-ẽjŋ]

Results

Target plural productions by pattern and group



Adults

near-ceiling across all patterns (95–100%)

Children

REG high accuracy (97%)

NAS intermediate (34%)

AL low (16%)

IL very low (5%)

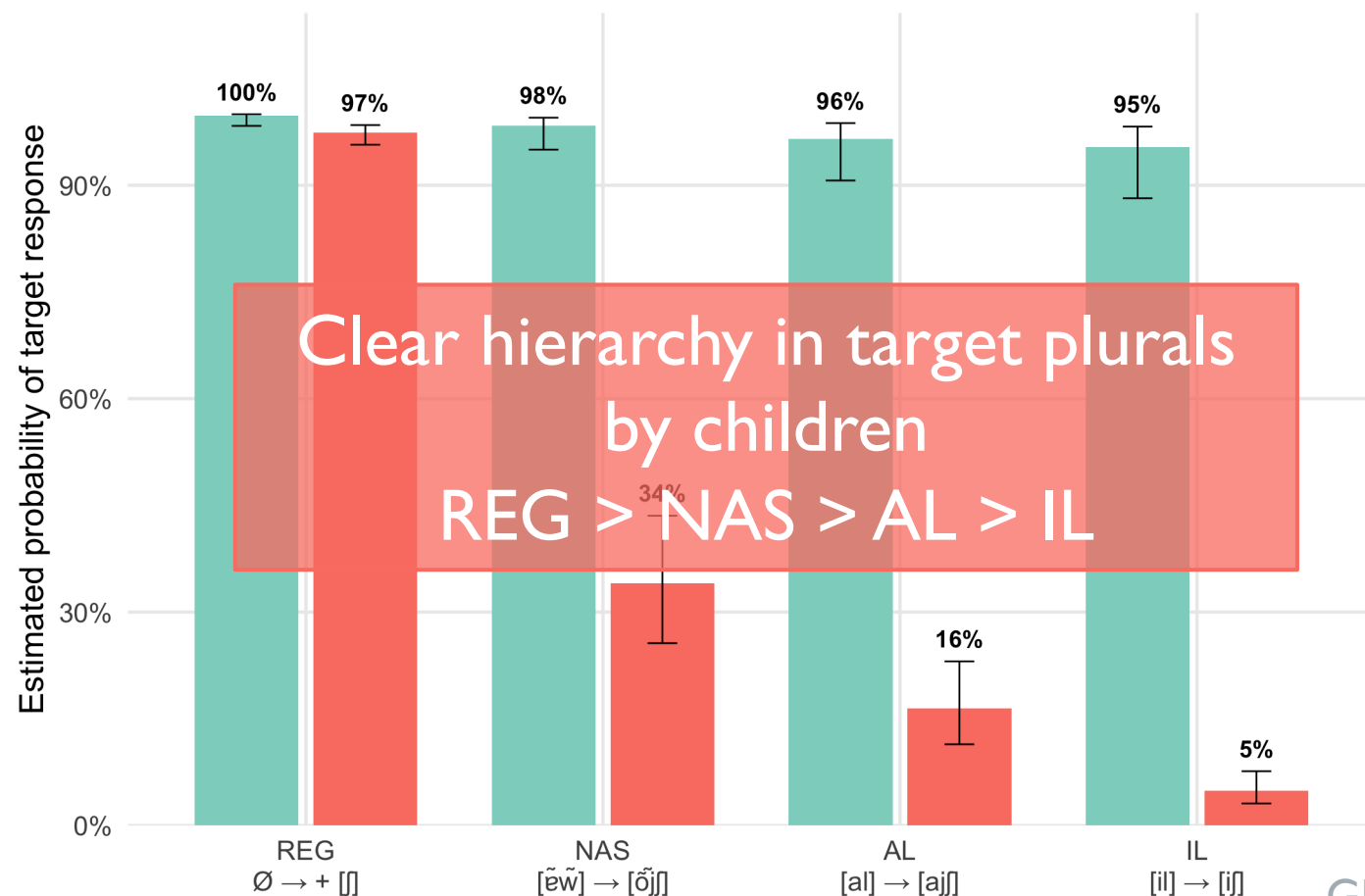
group

Adults
Children

GLMM (glmer-R)

Results

Target plural productions by pattern and group



Adults

near-ceiling across all patterns (95–100%)

Children

REG high accuracy (97%)

NAS intermediate (34%)

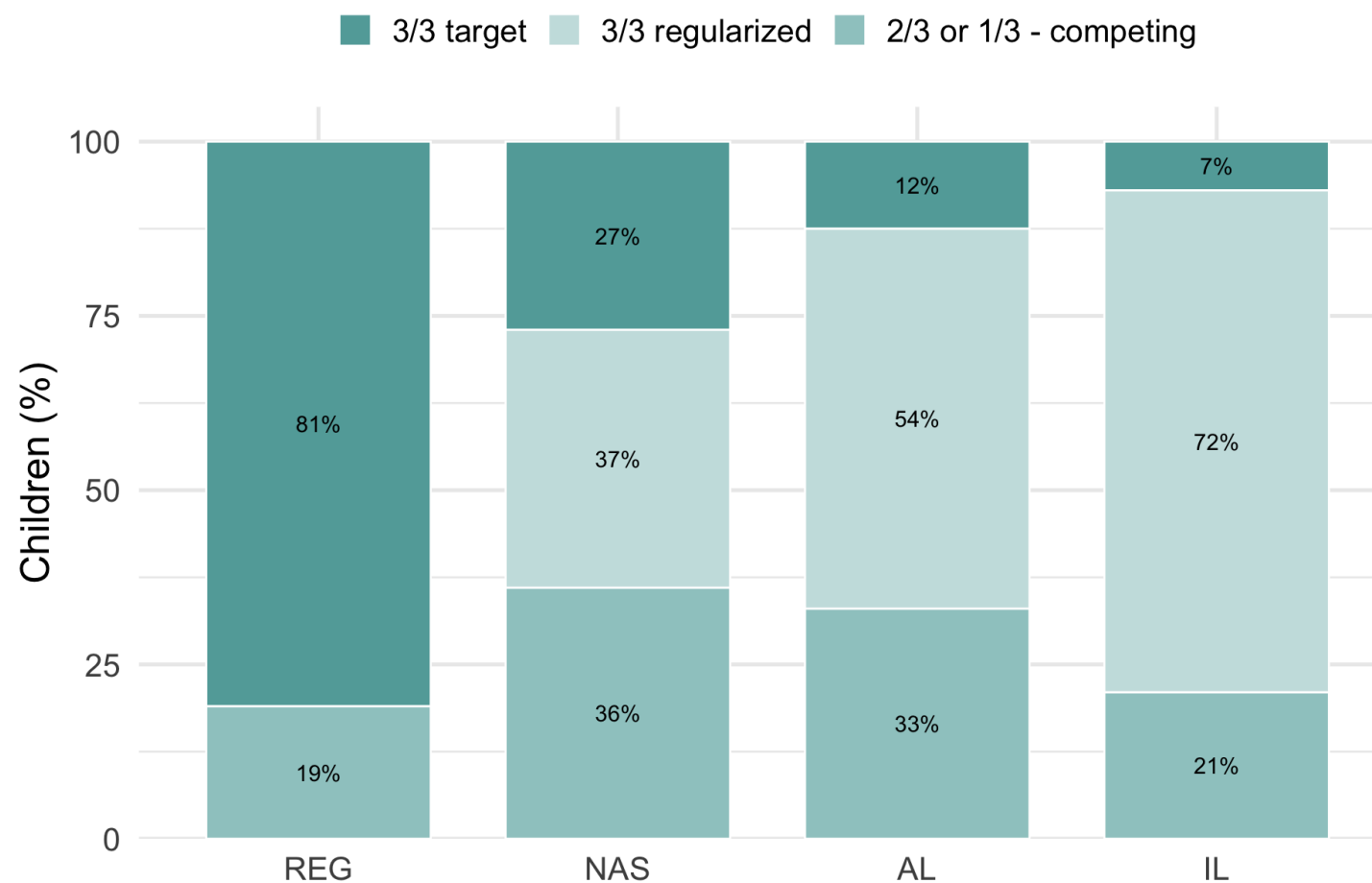
AL low (16%)

IL very low (5%)



Results

Children's response profiles by plural pattern

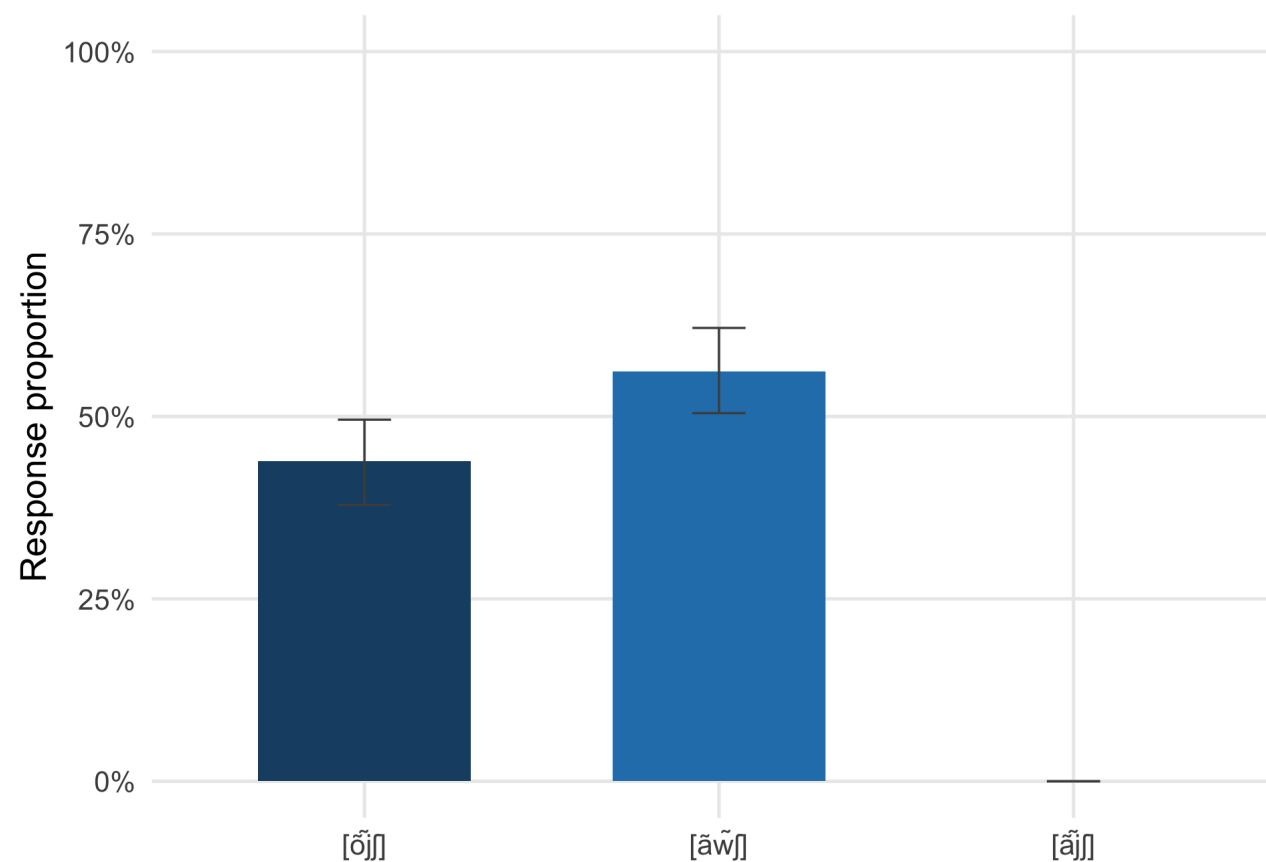




Results

Children — nasal plurals endings

Category proportions with 95% CIs (subject bootstrap)





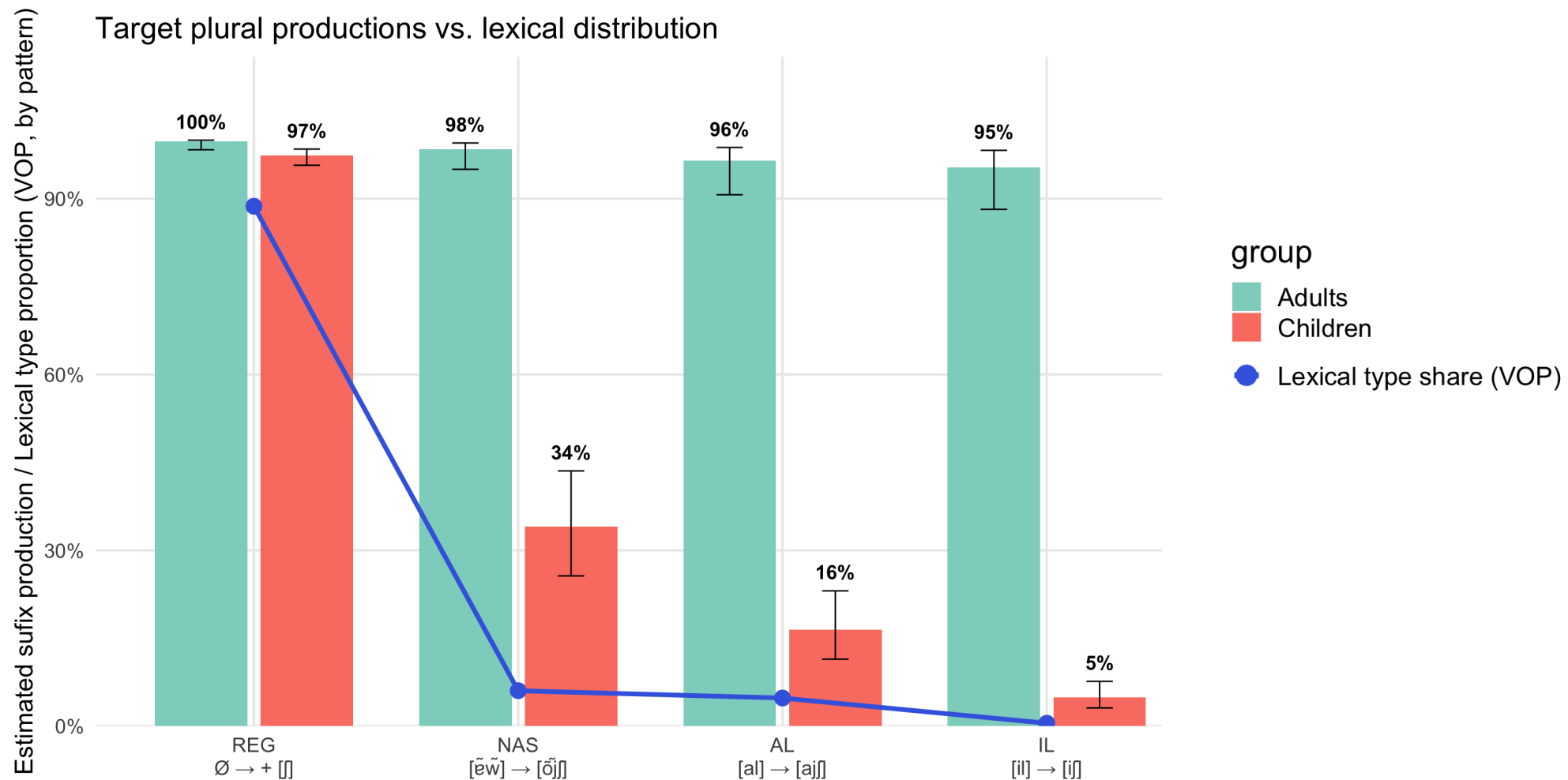
Results

Performance subgroups (children)

Pattern	Class 1 (38%)	Class 2 (38%)	Class 3 (27%)
reg	64% (3/3 correct)	92% (3/3 correct)	91% (3/3 correct)
al	99% (0/3 correct)	44%–34%–22% (mixed)	45% (3/3 correct)
il	100% (0/3 correct)	76% (0/3), 20% (1/3)	29%–31%–25% (mixed)
nas	79% (0/3 correct)	41%–23%–17%–18% (spread)	73% (3/3 correct)



Discussion

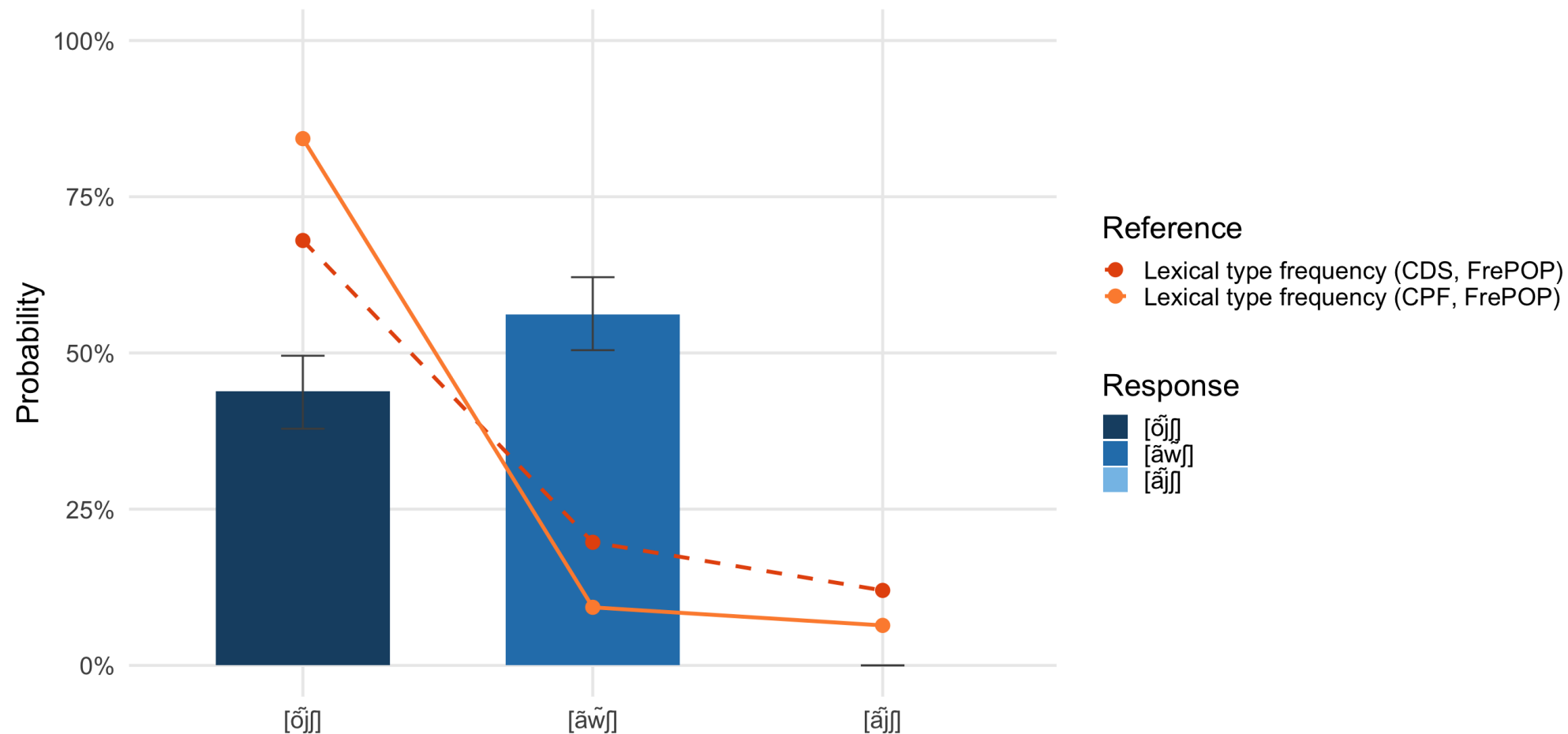




Discussion

Children — nasal plurals

Responses vs. lexical type frequencies (95% CI)



Conclusions

Do children already show near-ceiling productivity with [-ʃ] at kindergarten?

YES

When /l/→[j] interacts with a preceding vowel, do children show systematic patterns that line up with the natural competitors (-[ilɪsʃ] / [-iʃ] , ([-alɪsʃ] / ([-ajʃ]) rather than random noise?

YES

With three competitors [-ẽw̃ʃ] [-õjʃ] [-ẽjʃ], did children at final kindergarten moved from early [-ẽw̃ʃ] to the productive [-õjʃ] , with [-ẽjʃ] confined to lexical “pockets” at kindergarten?

Some of them, yes (~1/4). ~1/3 shows consistently the regularized form.

Do the same children who are “near-adult” in one pattern also stabilize in others?

Not always!

Future steps

- Look closely at subject-level random effects for each pattern, with a Bayesian approach
- Analyse the performance of these same children one year later - 6 years old
- Compare their performance with children with Developmental Language Disorder (DLD)
- ...

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Thank you!

Merci!

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