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Lexical encoding of new phonological categories

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Phonetic decoding

Underlying phonological form

Phonological
Decoding

Phonetic form

Japanese

Spanish

Catalan

[ra]

[ε]

[e,ε]

Consonants
& vowels

Phonetic
Decoding

Assimilate to the
phonetically closest
segment

- acquired early & bottom up
- non plastic in L2

Acoustic/Phonetic code

||a, ɪa|

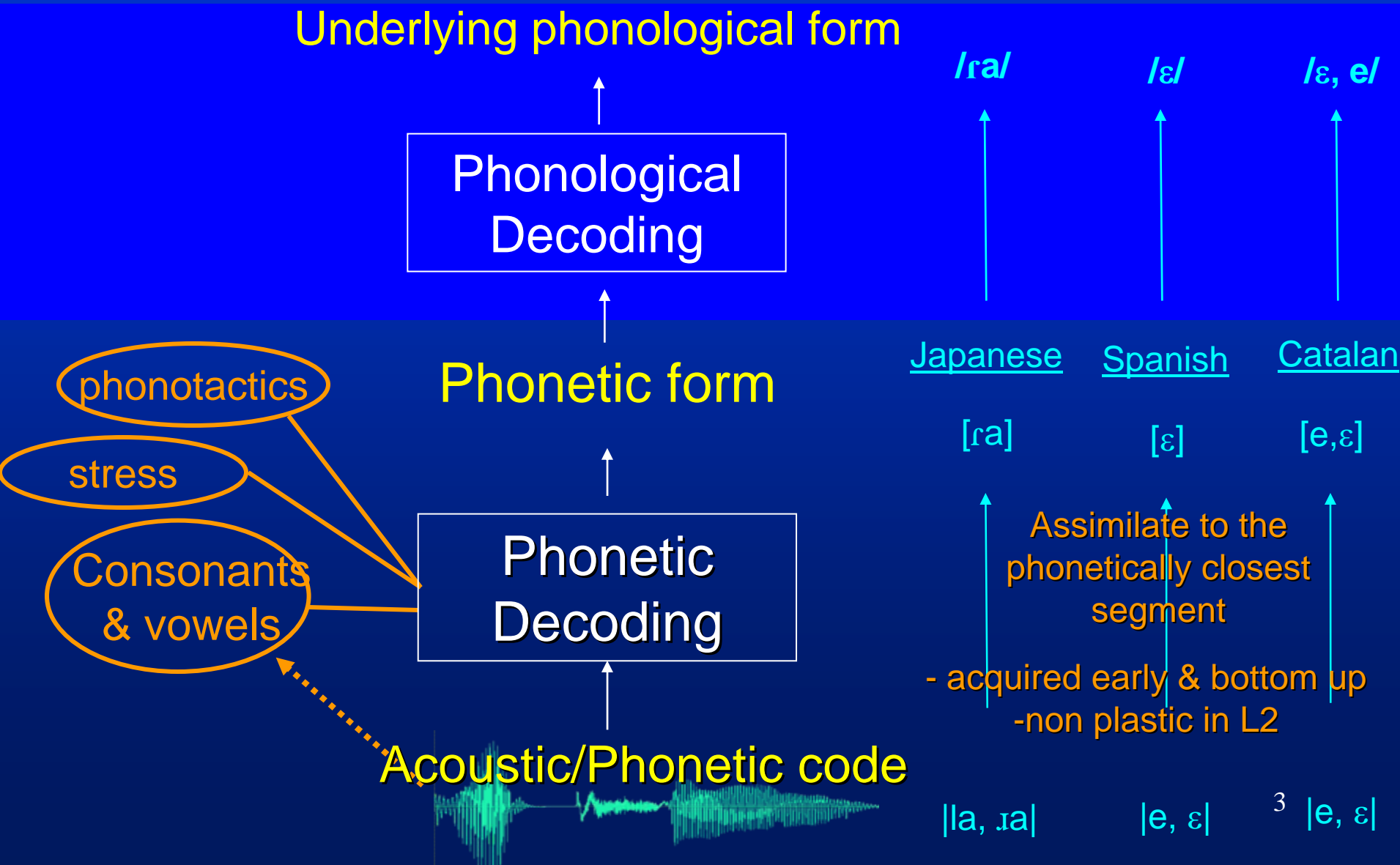
|e, ε|

² |e, ε|

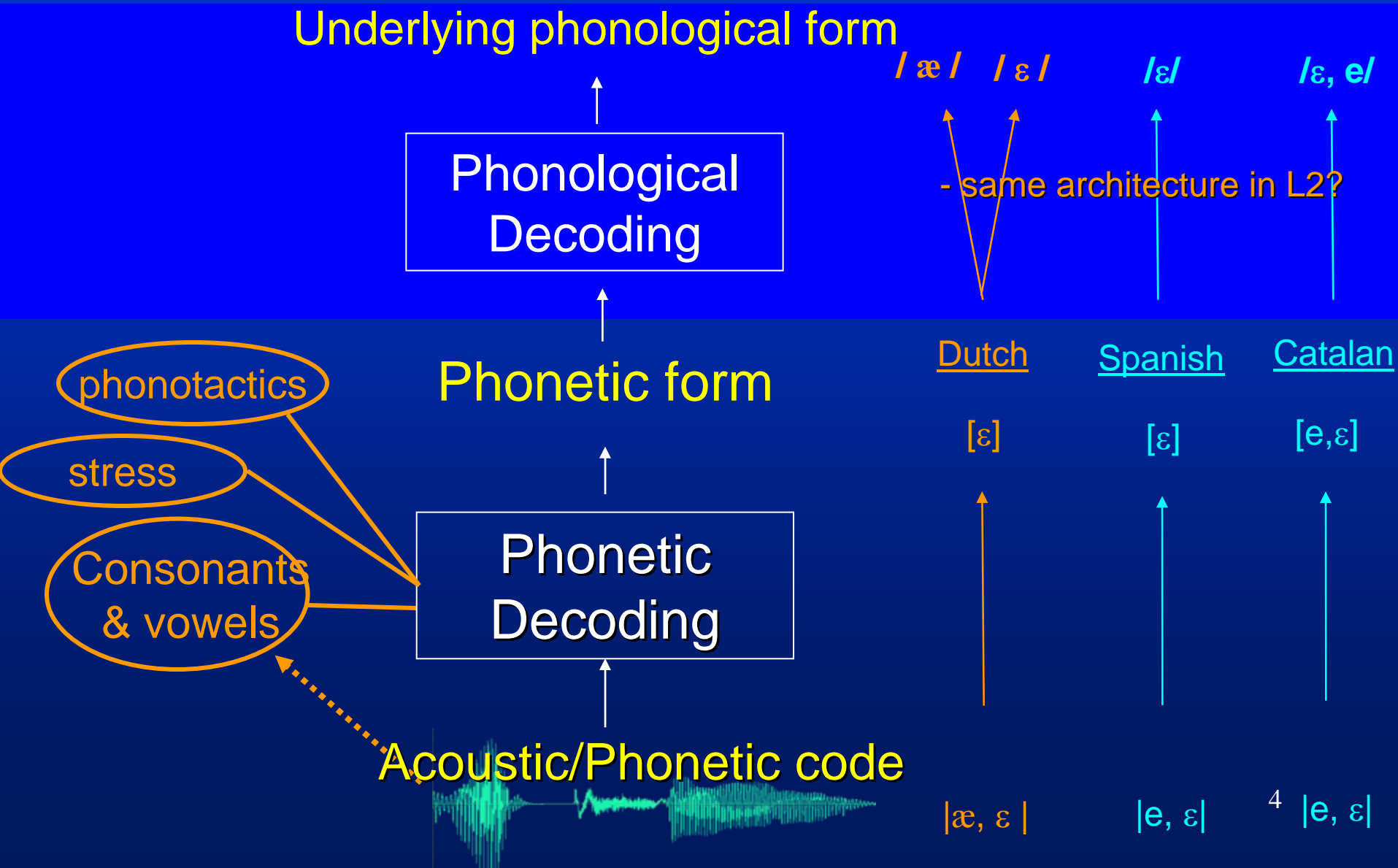




Lexical encoding for L2 words



In another case, however



Four combinations

+ targetlike Category
+ Lexical Contrast

Native speakers

– targetlike Category
+ Lexical Contrast

Weber & Cutler 2004
Hayes-Harb & Masuda 2008

+ targetlike Category
– Lexical Contrast

L1 acquisition
Perceptual learning

– targetlike Category
– Lexical Contrast

Pallier et al. 2001
Ota et al. 2009



Is there a dissociation between both levels in L2?

- Closer look at the link between category learning and lexical encoding in a second language
- 2 groups of learners of French
- 2 experiments:
 - Examine categorization performance
 - Look at the form of lexical representations



THE EXPERIMENTS

Methods and participants

ABX

- 19 advanced
- 19 intermediate
- 8 French natives
- 13 ,monolinguals‘

Lexical Decision

- 19 advanced
- 19 intermediate
- 8 French natives

late learners of French

Advanced learners

Residence in France (6 mo. ~ 3+ years)
min. 8 semesters of French

Intermediate learners

no long exposure in France/French
speaking country;
max. 4 semesters of French

native speakers (control)

French (knowledge of English)

American English (no French)



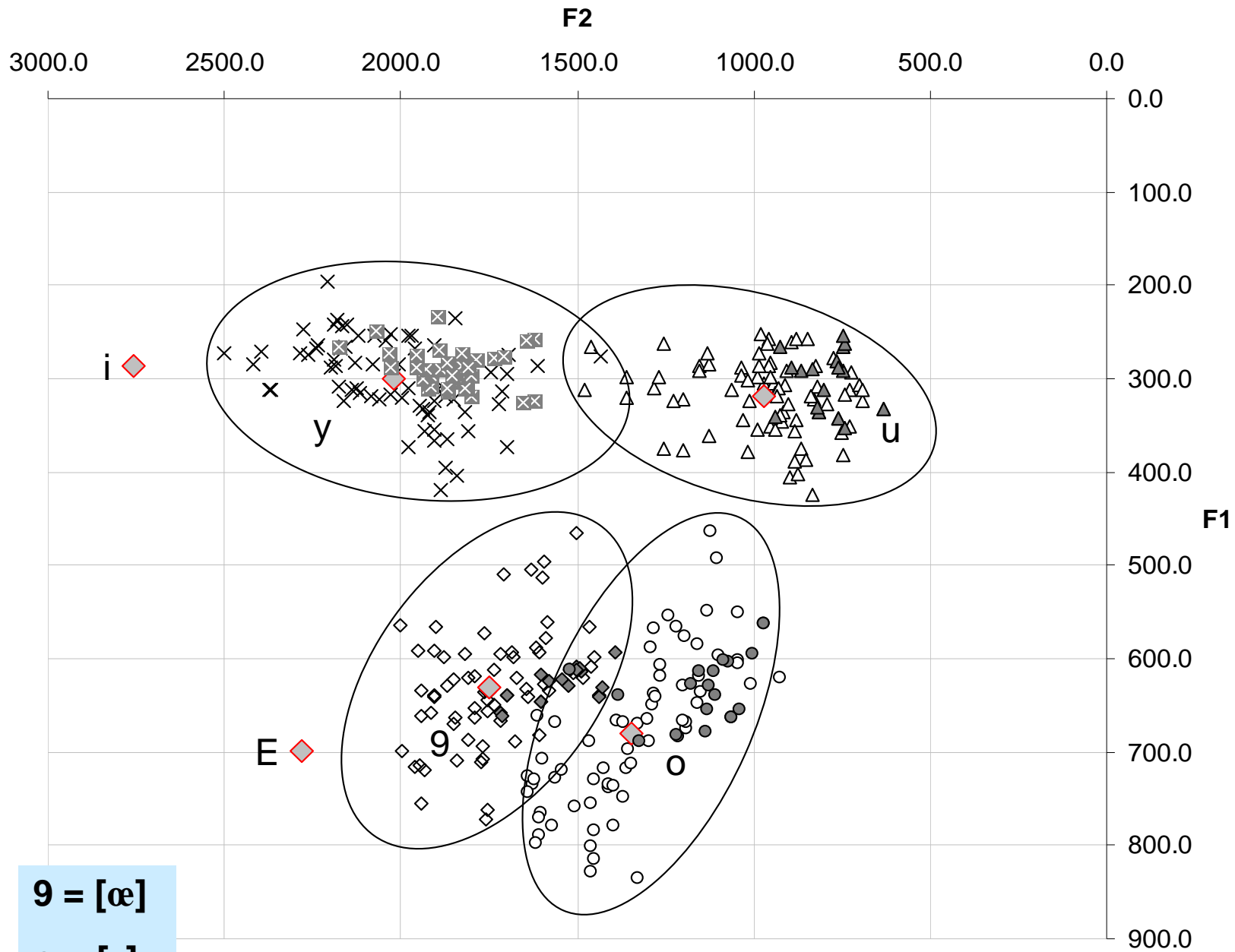
[i]
[ɛ]

[y]
[œ]

[u]
[o]

Stimuli:

FRONT ROUNDED VOWELS



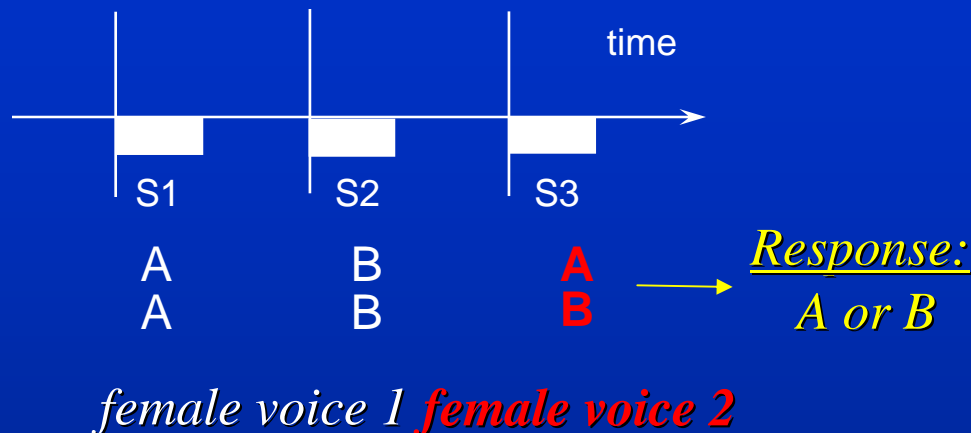
ɜ = [œ]

o = [ɔ]

Category acquisition

- High phonetic variability for [u] in English (across contexts), which overlaps the [y]-[u] distribution in French, makes acquisition of the contrast difficult
 - confusion of [y] with [u] is strongest in coronal contexts, and much less in labial (Levy and Strange 2008, Flege & Hillenbrand 1984, Gottfried 1984, Flege 1987)
 - generally less confusion of [i] with [y]
- Similar pattern is predicted for [ɔ]-[œ]
 - Mid-vowels could be harder to discriminate due to the narrower vowel space
 - However, categorization might be easy if [œ] is associated with a rhotic sound [ɜ̥] in English (Kingston 2003), while [ɔ] is mapped onto AE [ɔ]

Exp 1: ABX on [u]-[y] and [ɔ]-[œ]



Conditions:

control: sun vub, tid ted

high: mub myb, tud tyd

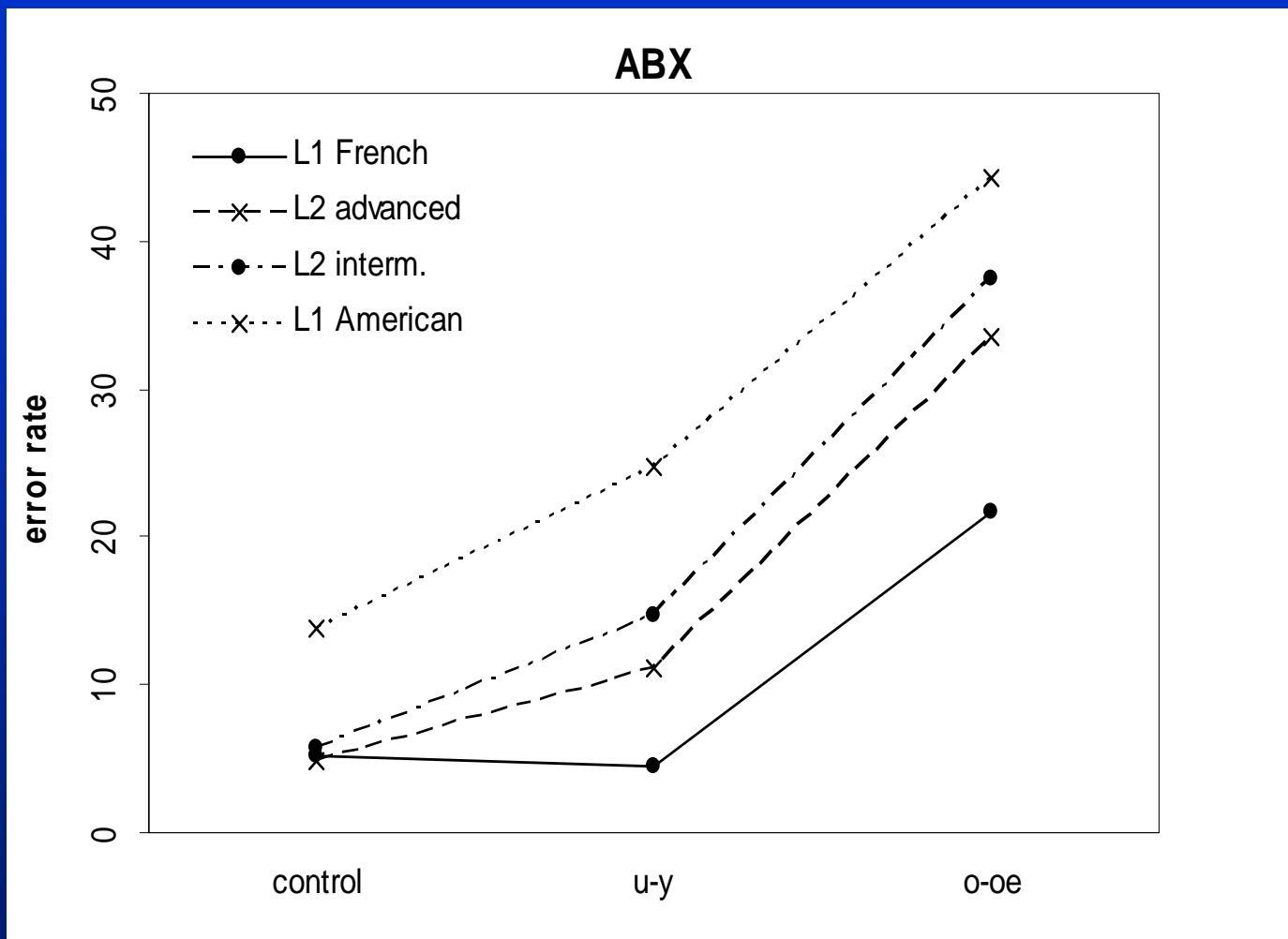
mid: mɔb mœb, tɔd tœd

192 randomized trials:

16 control 8 i/e + 8 cons.

16 high u/y

16 mid ɔ/œ



All groups have higher errors on the **mid** vowel contrast

But note the scale: below 50%

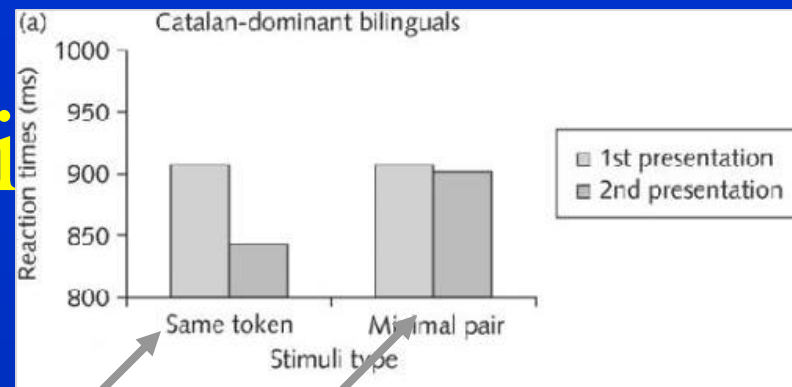
- Both learner groups differ from the native speakers on all experimental vowel pairs, but not on the control.
- Intermediate and advanced groups are not significantly different on any vowel pair ($p > .1$ in all cases).



Summary: Phonological ABX

- Learners: small error rate for **[u-y]** (12%)
- Performance overall worse for **[ɔ-œ]**
 - Establishing this category seems most difficult for both learner groups
- Seemingly persistent errors:
 - Intermediate and advanced learners are **not** different from each other, and **both differ** from the natives

Experiment 2: Lexical



- Method (see [Pallier et al. 2001](#))
 - Speeded auditory Lexical decision („real word?“)
 - Word pairs separated by 8 – 20 items in between
 - Facilitation (RT) on conditions „*same*“ vs. „*minimal pair*“

a	vie	sourd	lors	
...	a	vie	sourd	lors
a
...	b	vue	sure	leur

- Stimuli (words + nonwords)
 - 40 test words: 5 pairs for 4 different contrasts :
 - **i-y**, **u-y**, **ɔ-œ** E oe
 - 40 nonwords (similar to the test words)
 - 180 fillers
 - Counterbalanced in 4 lists (aa – bb – ab – ba)

Exp 2: Repetition priming on minimal pairs

Mean reaction times for catalan-specific contrasts [e-ɛ] and [o-ɔ]

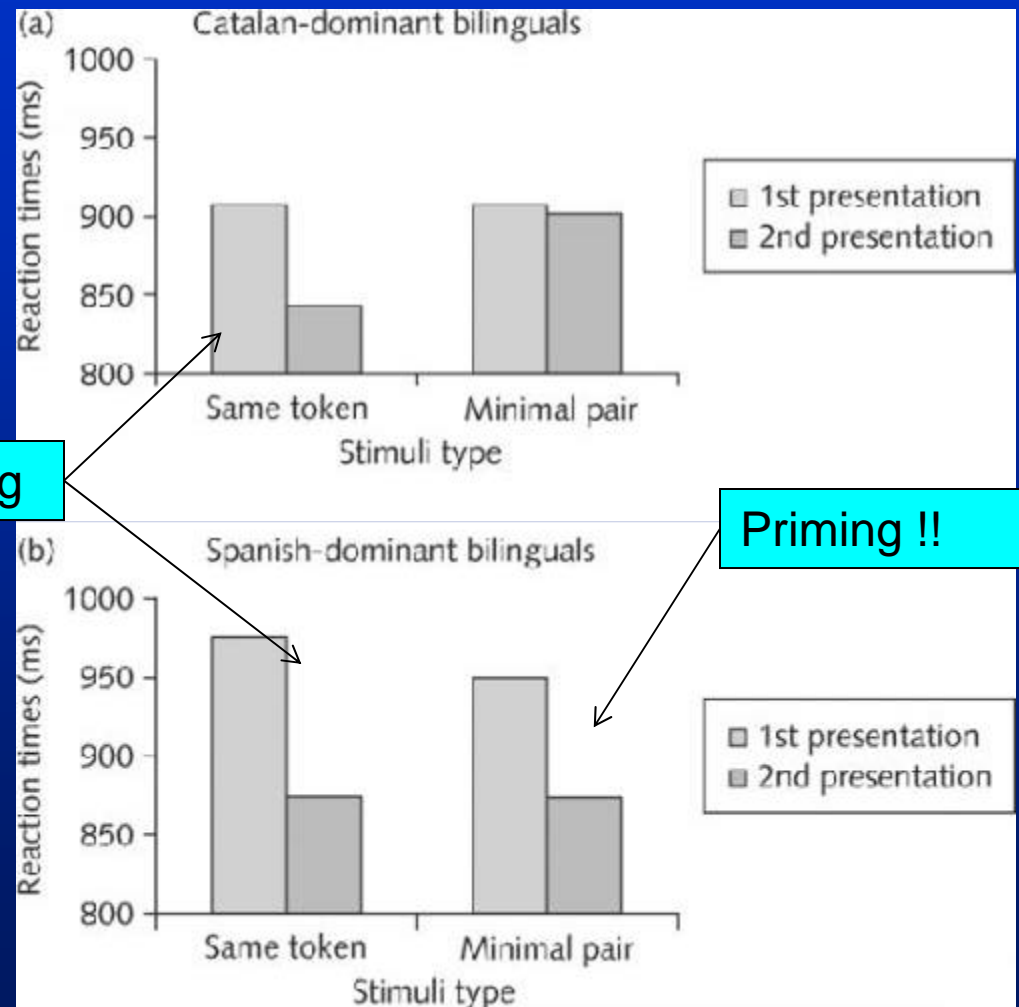
by early bilinguals:

Catalan-dominant (a)

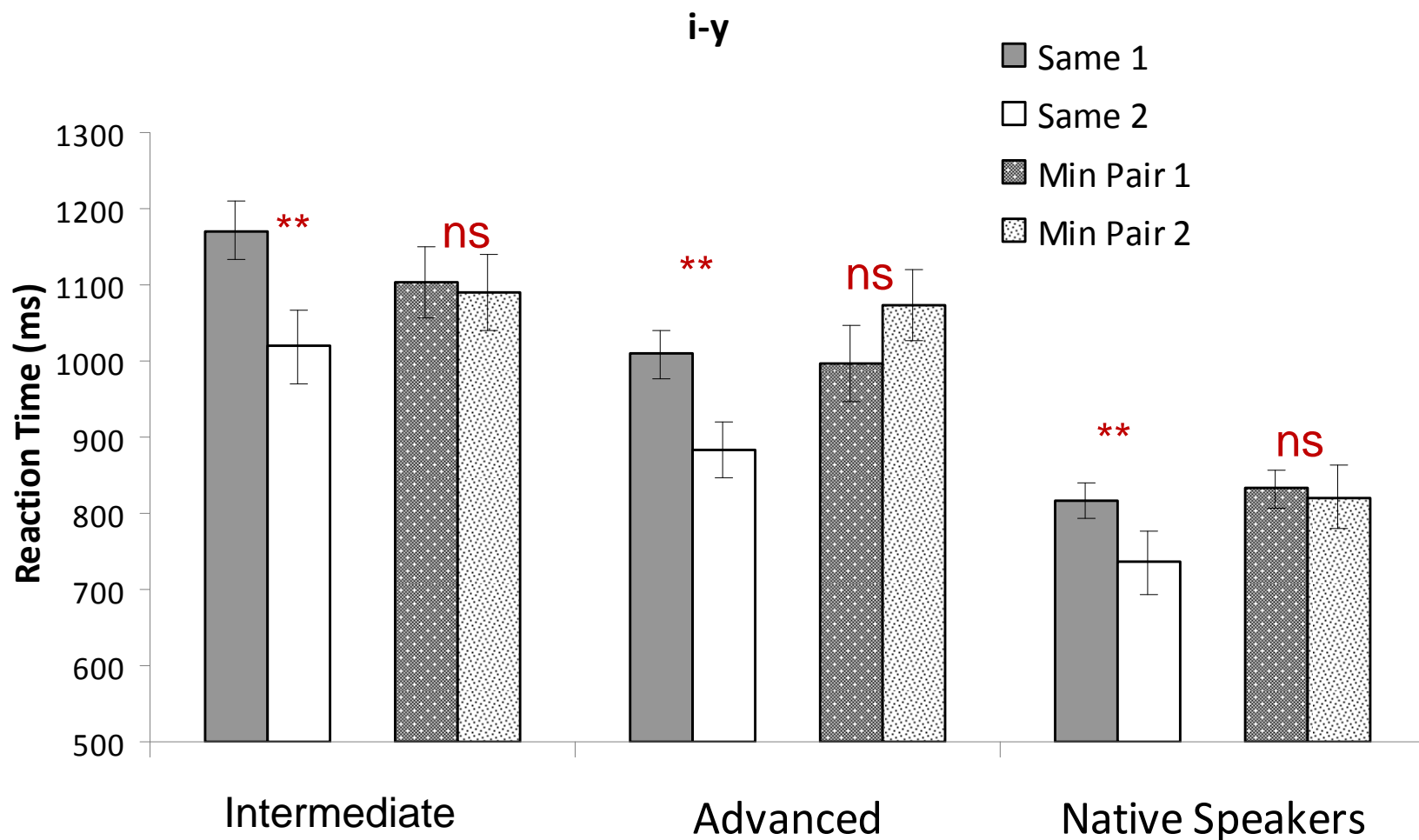
vs.

Spanish-dominant (b)

(Pallier, Colomé, and Sebastián-Gallés 2001)



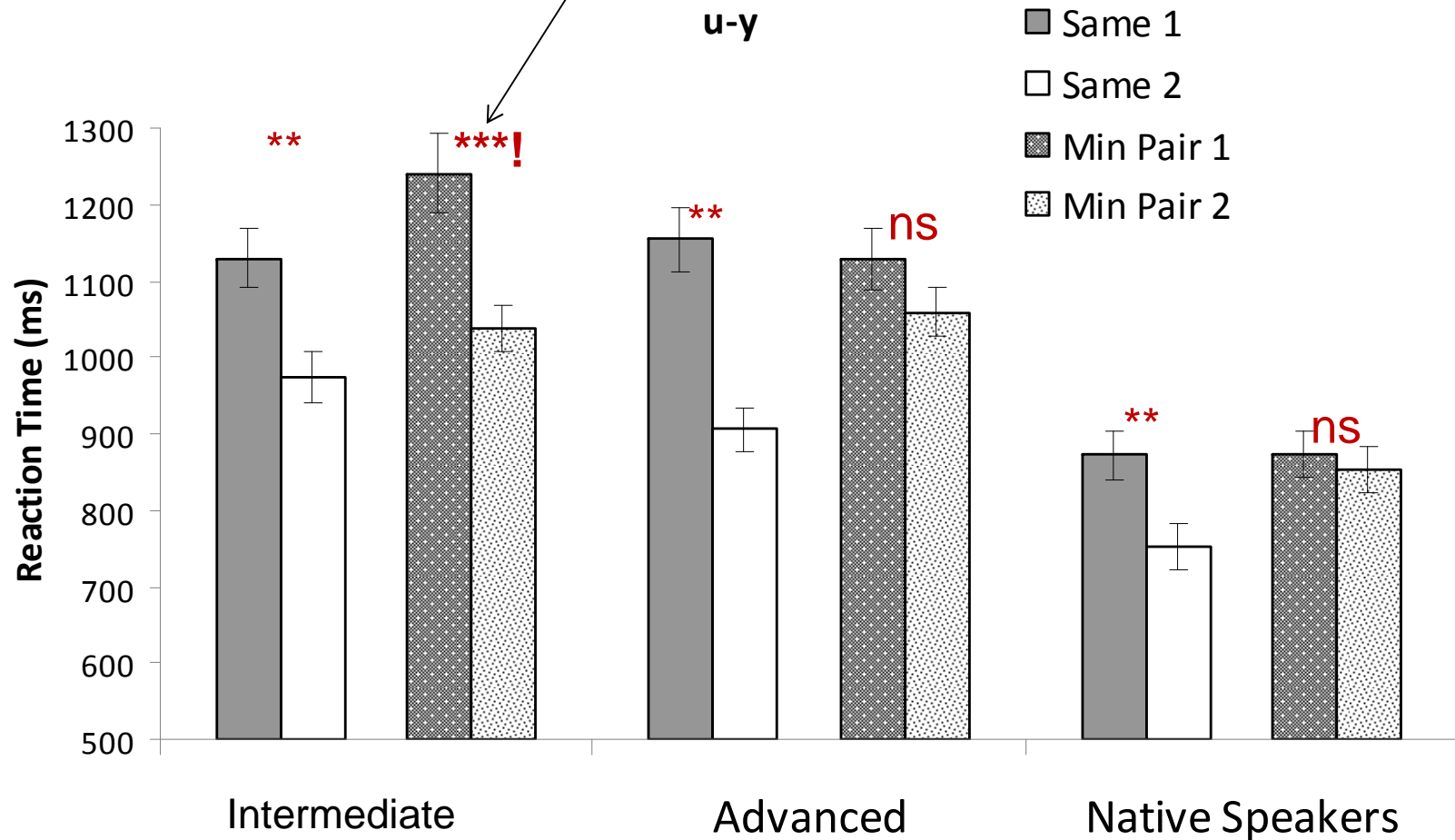
Results for [i-y] (control)



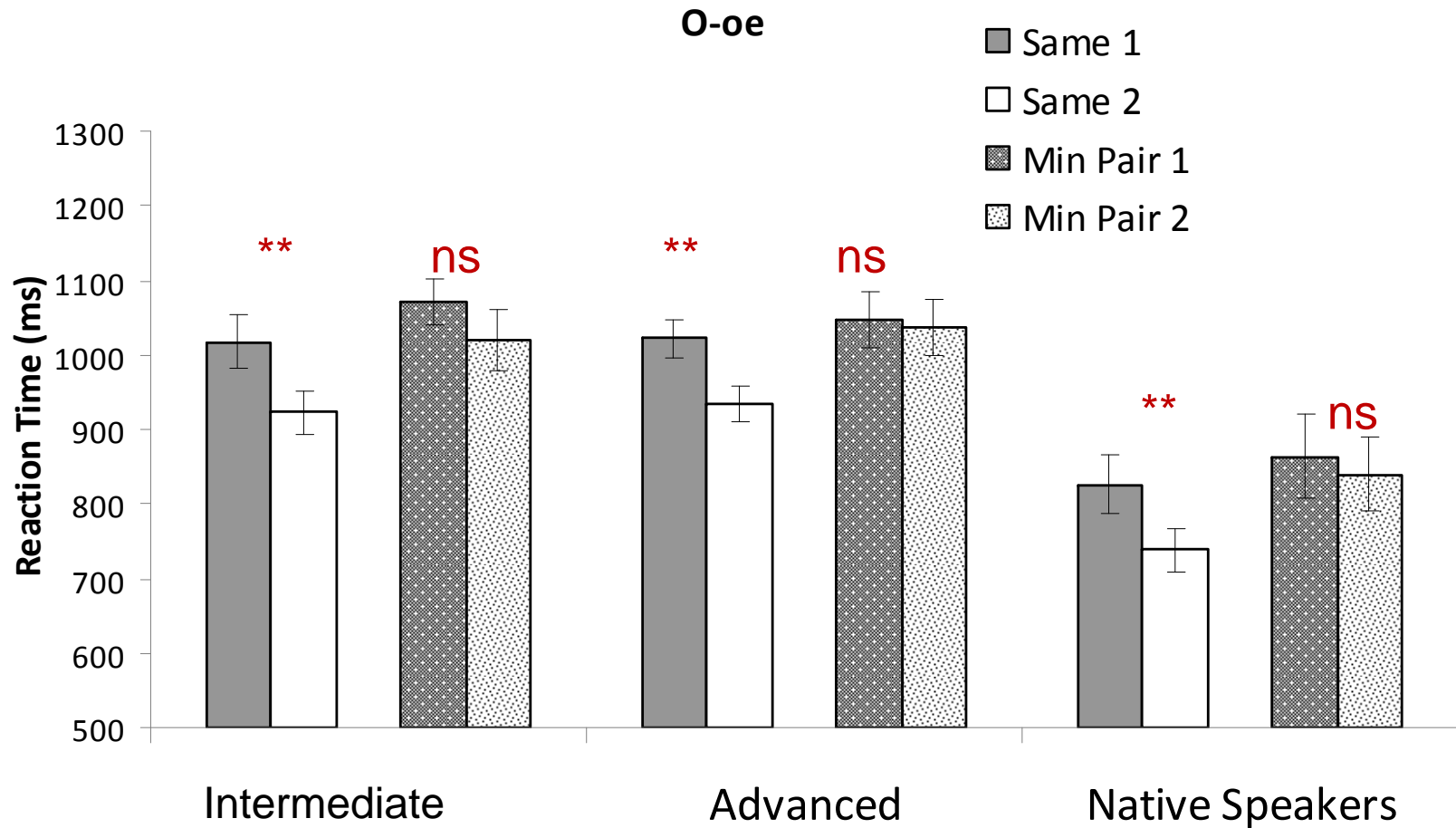
Results for [u-y]

Priming !!

u-y



Results for [ɔ-œ]





Summary

- Condition **same** elicits priming in all contrasts for all groups
- For the control contrast **[i-y]**
 - All three groups behave alike: no priming on **minimal pair** condition
 - => no sign of spurious homophony for this contrast
- For the test contrast **[u-y]**
 - Advanced = Native speakers : no priming
 - Intermediate: significant priming on **minimal pair** condition
- For the test contrast **[ɔ-œ]**
 - All three groups behave alike, and do **not** show priming on the **minimal pair** condition

General summary

- However, both learner groups are not different on the ABX task
 - Error rate is small, but significantly higher than the natives
- **Advanced learners** are like the native speakers in the lexical decision, even though they are like the intermediates on ABX
 - They establish lexical contrasts « regardless » of their performance in ABX – without experiencing any benefit at the level of categories
- **Intermediate learners**, despite rather good categorization of [u-y], experience lexical homophony
 - Conversely, they have lexical contrast for the categories which are most difficult to discriminate..... (o-oe)

Dissociated mechanisms

- For both learner groups, it seems that establishing a lexical contrast is possible
 - for both [u-y] and [o-oe] in case of the **advanced**
 - only for [o-oe] in case of the **intermediate**
- ...even if category „robustness“ remains limited.... Indeed, both groups are **not target like** at the categorization level



Our results

+ targetlike Category
+ Lexical Contrast

Native speakers

– targetlike Category
+ Lexical Contrast

Advanced [u-y] + [o-oe]
Intermediate [o-oe]
(PRESENT DATA)



+ targetlike Category
– Lexical Contrast

Training studies
L1 acquisition

– targetlike Category
– Lexical Contrast

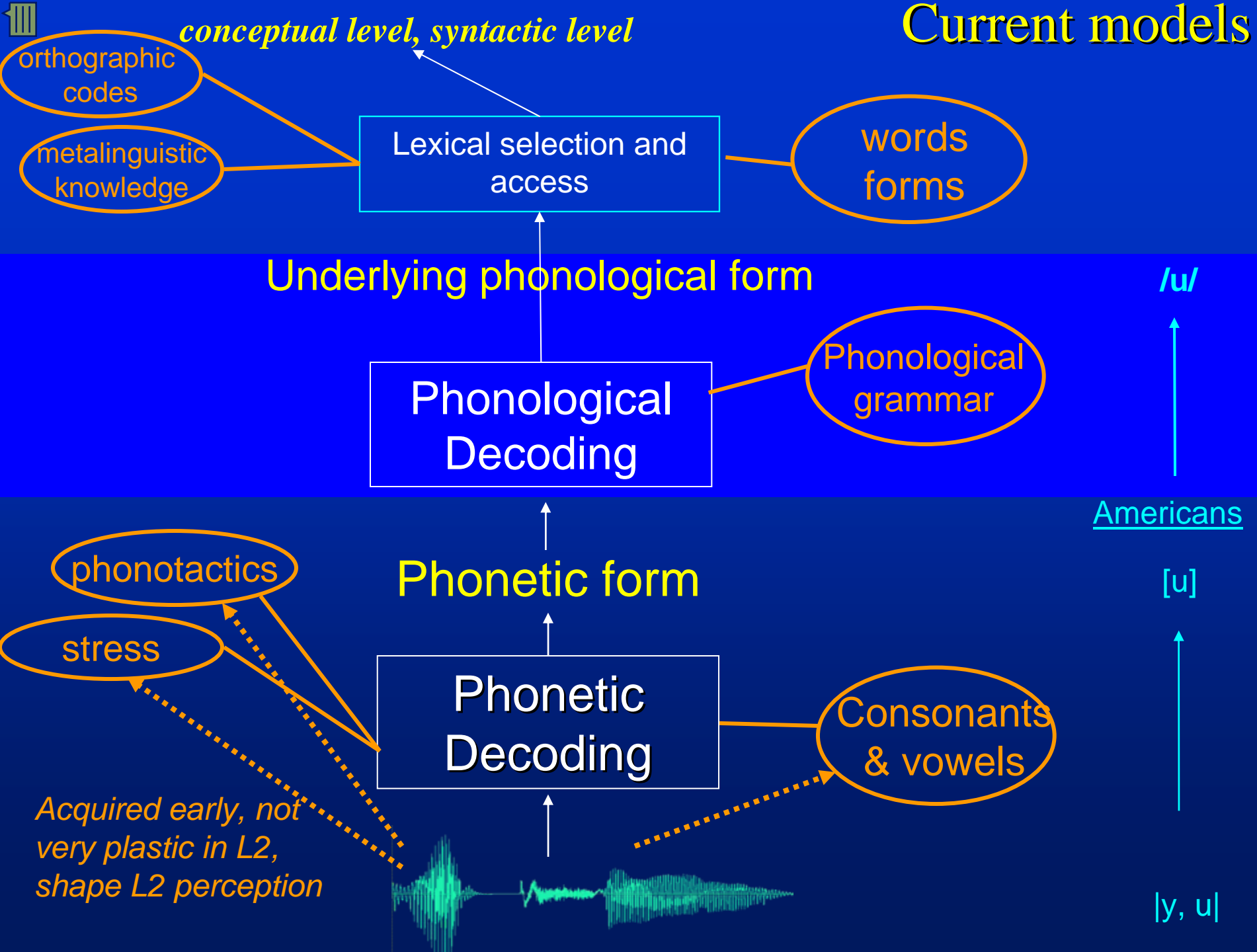
Intermediate [u-y]
(PRESENT DATA)



L2 phonological acquisition

- Proceeds differently from first language phonological acquisition
- Converging evidence towards dissociated mechanisms :
 - Category acquisition
 - Formation of contrastive lexical representations
- Lexical contrast does not always result in a benefit at the level of categories in L2 acquisition
- What are the mechanisms that allow development of lexical contrast in absence of robust sound categorization?

Current models





conceptual level, syntactic level

Lexical encoding

Lexical selection and access

words forms

Underlying phonological form

Phonological Decoding

Phonological grammar

Phonetic form

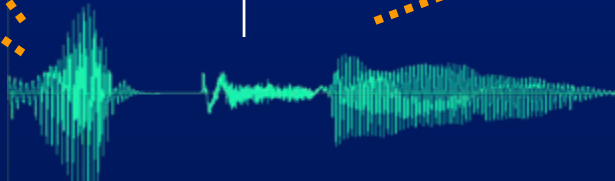
Phonetic Decoding

phonotactics

stress

Acquisition at the lexical level is constrained by acquisition at the segmental level

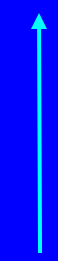
Consonants & vowels



/u/



/u/

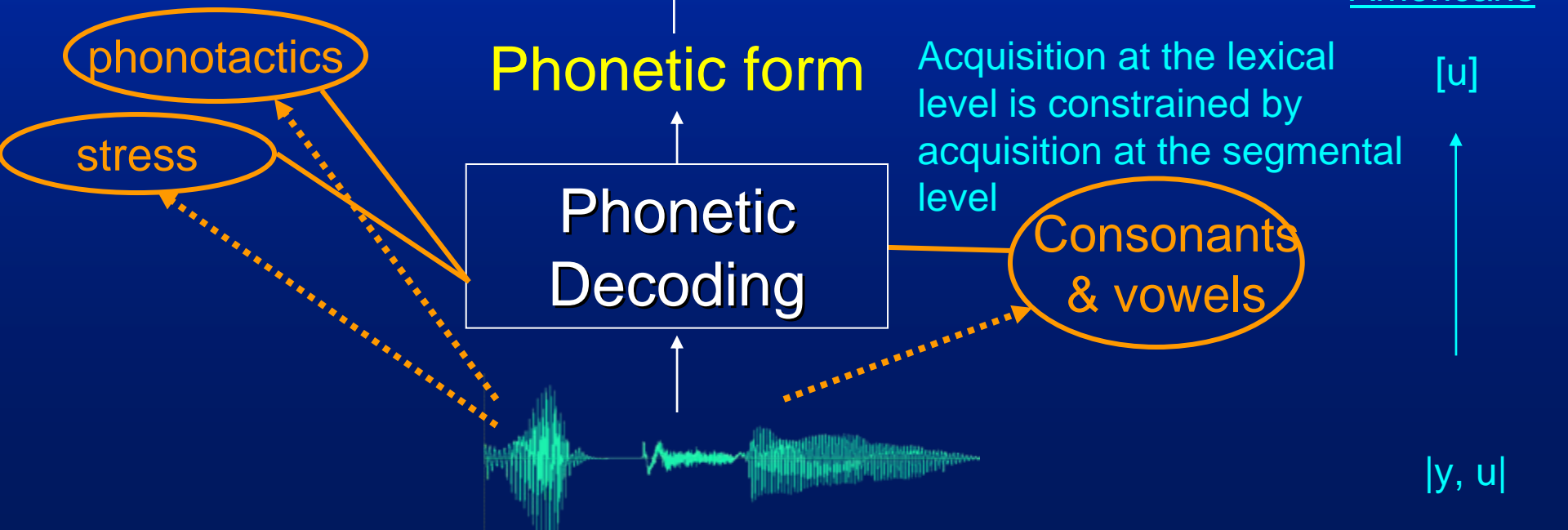


Americans

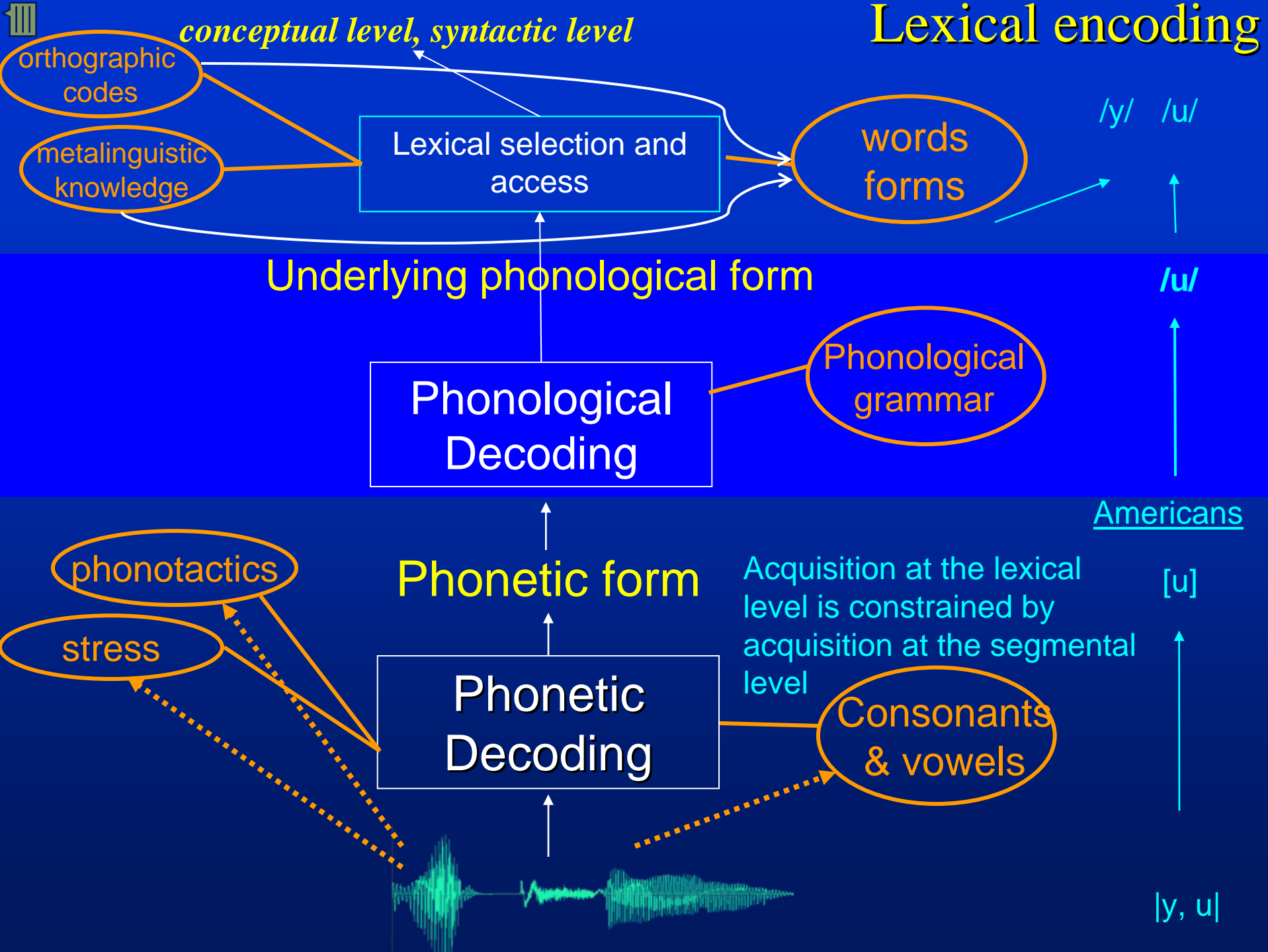
[u]

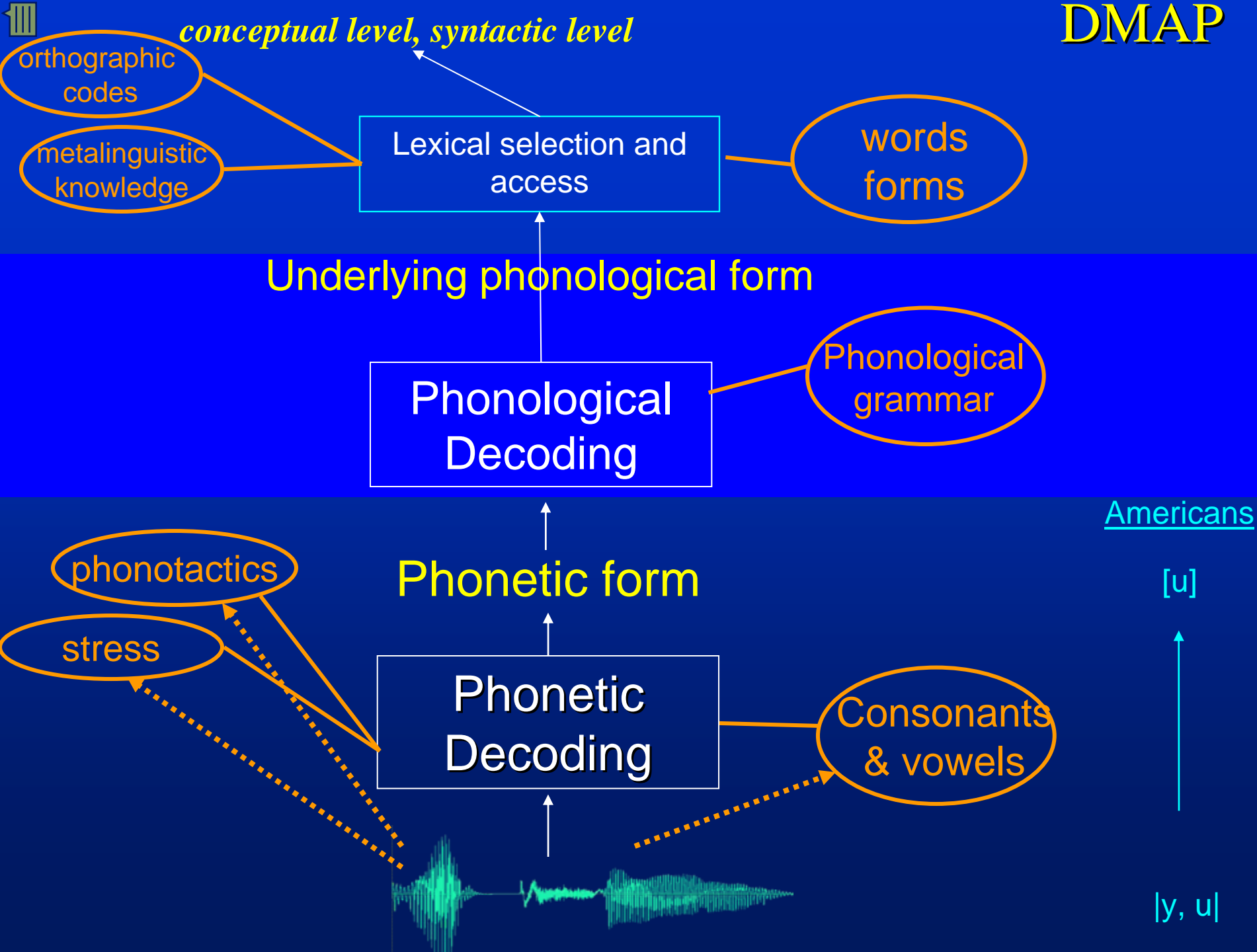


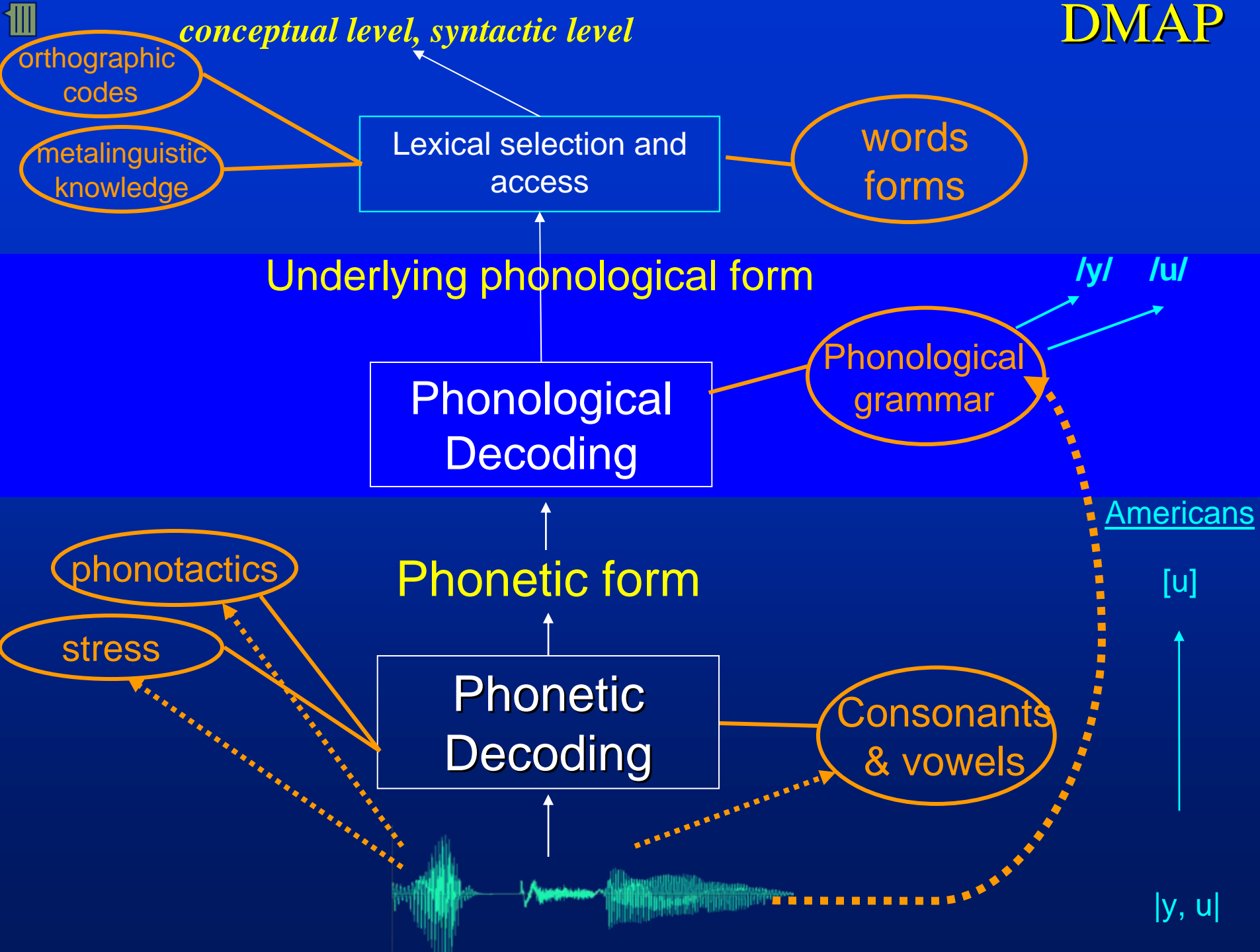
[y, u]

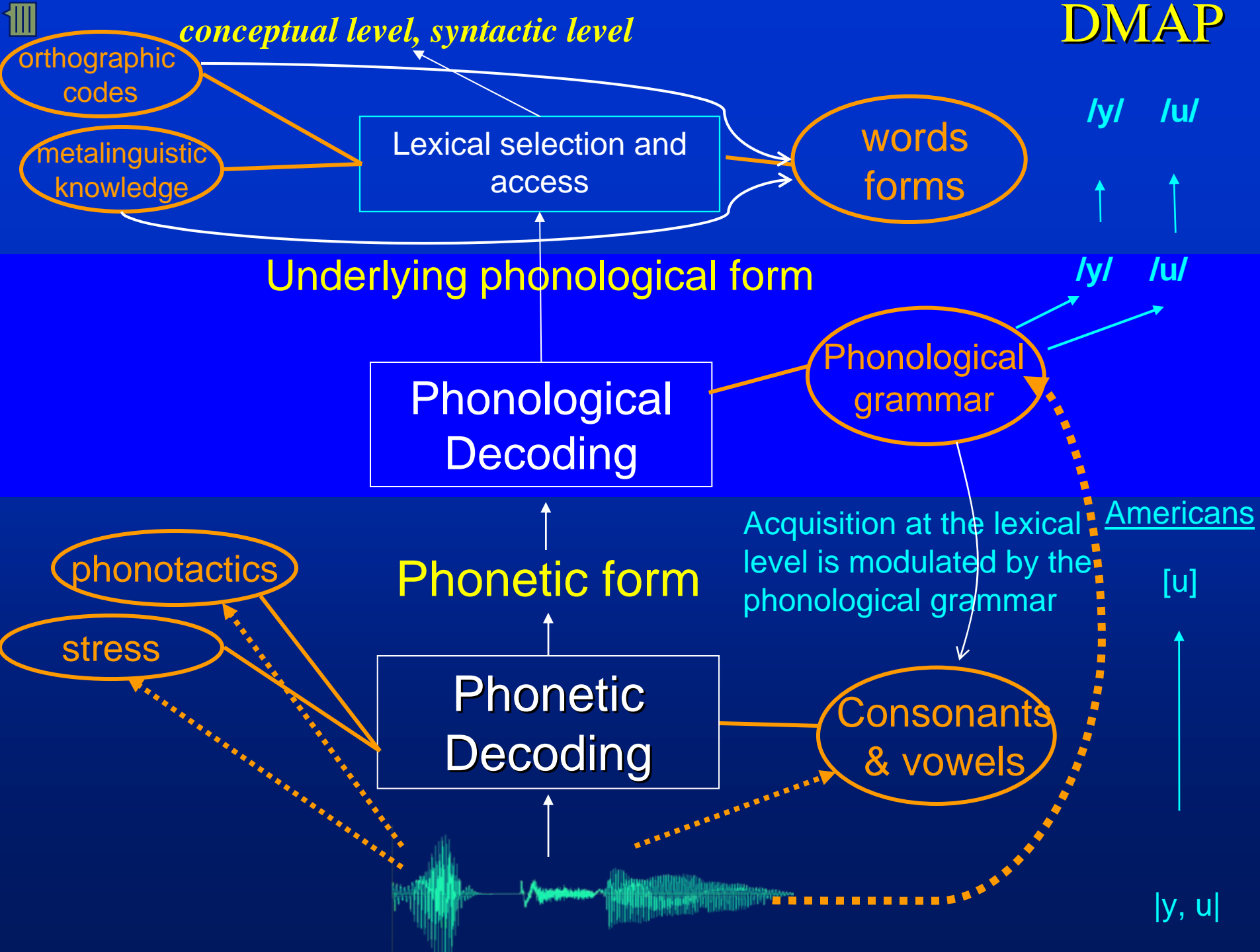


Lexical encoding









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