

# Holding on to childhood language memory



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# Question:

- When you use a language in early childhood but not later, what happens to your knowledge of this language?
- Do you lose memory of the language, or just ability to retrieve it?

# 4 groups – all UCLA students

- Novice learners (no childhood exposure)
- Childhood hearers (regular hearing, but minimal speaking)
- Childhood speakers (sharp drop in speaking after age 7)
- Native speakers (regular speaking throughout life)

Study focuses on sound  
contrasts that are not used in  
English.

# Stimuli used in phoneme perception and production tasks

[taŋ]<sup>a</sup> (a crowd)

[t'aŋ] (the earth)

[t<sup>h</sup>aŋ] (hot water)

[tal] (the moon)

[t'al] (daughter)

[t<sup>h</sup>al] (mask)

[tək]<sup>b</sup> (virtue)

[t'ək] (cake)

[t<sup>h</sup>ək] (chin)

<sup>a</sup> [ŋ] represents the velar nasal sound (as in the last sound of 'sing').

<sup>b</sup> [ə] represents the mid-central vowel (as in the middle sound of 'sun').

# Phoneme perception task

- How well can they hear these contrasts?
- Subjects hear word, choose which word it is.

# How did they do?

Table 3

Phoneme perception task: percent correct responses (with standard errors) by group

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Novice learner	61.3 (3.4) <sup>a</sup>
Childhood hearer	88.3 (4.4) <sup>b</sup>
Childhood speaker	89.4 (2.9) <sup>b</sup>
Native speaker	98.6 (3.1) <sup>b</sup>

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# Phoneme production task

- How well can they pronounce these contrasts?
- Subjects read words aloud.

# How did they do?

Table 4  
Phoneme production task: mean VOT (with standard errors) in milliseconds by group

	Aspirated	Plain	Tense
Novice learner	68 (8)	57 (9)	47 (9)
Childhood hearer	64 (17)	36 (9)	33 (19)
Childhood speaker	109 (5)	75 (9)	29 (8)
Native speaker	97 (5)	78 (5)	11 (1)

# How reliably could they make the contrasts?

Table 5

Phoneme production task: pair-wise *t*-statistics for VOT contrasts by group

	Consonant pair		
	Aspirated–plain	Aspirated–tense	Plain–tense
Novice learner	0.90	1.77	1.76
Childhood hearer	1.96	1.68	0.14
Childhood speaker	5.33* <sup>a</sup>	10.18*	4.14*
Native speaker	4.73*	17.72*	12.01*

\*  $P < 0.01$ .

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# Did they sound like native speakers?

- Eight native speakers listen and judge.

1 = definitely non-native

5 = definitely native

# Did they sound like native speakers?

Table 6

Phoneme production task: mean accent ratings (with standard errors) by group

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Novice learner	1.90 (0.16) <sup>a</sup>
Childhood hearer	2.56 (0.28) <sup>a</sup>
Childhood speaker	3.30 (0.17) <sup>b</sup>
Native speaker	4.59 (0.13) <sup>c</sup>

# Did they sound like native speakers?

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# Overall results: Perception

Childhood hearers

Childhood speakers > Novice learners

Native speakers

# Overall results: Production

Childhood speakers

>

Native speakers

Childhood hearers

Novice learners

# So do you lose memory or retrieval?

- Looks like mostly retrieval.
- Some aspect of the memory must remain.
- How else could we explain the fact that childhood exposure confers an advantage?

# Speaking vs. hearing

- Childhood speakers performed better on the production task than childhood hearers.

Seems reasonable, but ...

# Speaking vs. hearing

“As logical as it sounds, this is probably not the whole story. We have found that childhood overhearing experience can have lasting benefits for phonology production in Spanish (Au et al., 2002).”

# OK, so you remember sounds.

- Big deal.
- What about sentence structure (morphology and syntax)?

# More recent study

- Looks at grammatical ability among people with childhood exposure to Spanish.

# 4 groups

- Childhood speakers
  - Spoke Spanish regularly in childhood
  - Massive drop in using Spanish by age 7
- Childhood overhearers
  - Overheard Spanish regularly in childhood
  - Regular exposure dropped by age 6

# 4 groups

- Late L2 learners
  - Minimal or no exposure to Spanish in childhood
- Native speakers

# 4 groups

- These groups all took Spanish in high school and are now enrolled in 2<sup>nd</sup>-year Spanish at UCLA:
  - Childhood speakers
  - Childhood overhearers
  - Late L2 learners
- All 4 groups are UCLA students.

# How did they test them?

- Noun phrase production
  - “los pianos blancos”, “la vaca negra”
- Verb phrase production
  - (Fui a la tienda y...) compré leche.
- Grammatical judgment
  - Does this sentence sound OK?
- Narrative production
  - Rated by native speakers
- Sentence repetition (with and w/o noise)

# How did they do?

- Here is Table 5 from the article...

	Native speakers	Childhood speakers	Childhood overhearers	Typical late-L2-learners
<i>Morphosyntax</i>				
Production				
Noun phrase				
Number	96 <sub>a</sub> (2)	86 <sub>a</sub> (5)	86 <sub>a</sub> (4)	88 <sub>a</sub> (3)
Gender	96 <sub>a</sub> (2)	72 <sub>b</sub> (6)	70 <sub>b</sub> (5)	74 <sub>b</sub> (3)
Verb phrase				
Number	99 <sub>a</sub> (1)	83 <sub>a,b</sub> (6)	76 <sub>b</sub> (4)	76 <sub>b</sub> (3)
Person	98 <sub>a</sub> (1)	77 <sub>b</sub> (6)	73 <sub>b</sub> (4)	71 <sub>b</sub> (3)
Verb Tense	94 <sub>a</sub> (1)	53 <sub>b</sub> (7)	51 <sub>b</sub> (4)	47 <sub>b</sub> (3)
Sentence repetition (Number of errors per sentence)				
Inflectional errors	.07 <sub>a</sub> (.03)	.21 <sub>ab</sub> (.12)	.49 <sub>b</sub> (.13)	.62 <sub>b</sub> (.12)
Lexical errors	.02 <sub>a</sub> (.01)	.15 <sub>ab</sub> (.09)	.26 <sub>b</sub> (.08)	.22 <sub>b</sub> (.08)
Grammaticality Judgment				
Accuracy	0.91 <sub>a</sub> (0.01)	0.71 <sub>b</sub> (0.03)	0.62 <sub>c</sub> (0.02)	0.61 <sub>c</sub> (0.01)
Reaction time (msec)	1171 <sub>a</sub> (82)	2173 <sub>b</sub> (397)	2352 <sub>b</sub> (228)	2014 <sub>b</sub> (152)
<i>Grammatical well-formedness</i>				
Narrative Grammar Rating	4.9 <sub>a</sub> (.04)	3.3 <sub>b</sub> (.26)	2.6 <sub>c</sub> (.16)	2.6 <sub>c</sub> (.09)
<i>Perception of sentences in noise</i>				
No noise	98 <sub>a</sub> (1)	95 <sub>a,b</sub> (3)	88 <sub>b</sub> (3)	89 <sub>b</sub> (2)
Decrement due to noise	13 <sub>a</sub> (2)	30 <sub>b</sub> (5)	41 <sub>b,c</sub> (5)	52 <sub>c</sub> (3)

# Childhood speaker advantage

- Noun phrase production
  - “los pianos blancos”, “la vaca negra”
- Verb phrase production
  - (Fui a la tienda y...) compré leche.
- **Grammatical judgment**
  - Does this sentence sound OK?
- **Narrative production**
  - Rated by native speakers
- **Sentence repetition (with and w/o noise)**

# Childhood overheard advantage

- Noun phrase production
  - “los pianos blancos”, “la vaca negra”
- Verb phrase production
  - (Fui a la tienda y...) compré leche.
- Grammatical judgment
  - Does this sentence sound OK?
- Narrative production
  - Rated by native speakers
- **Sentence repetition (with and w/o noise)**

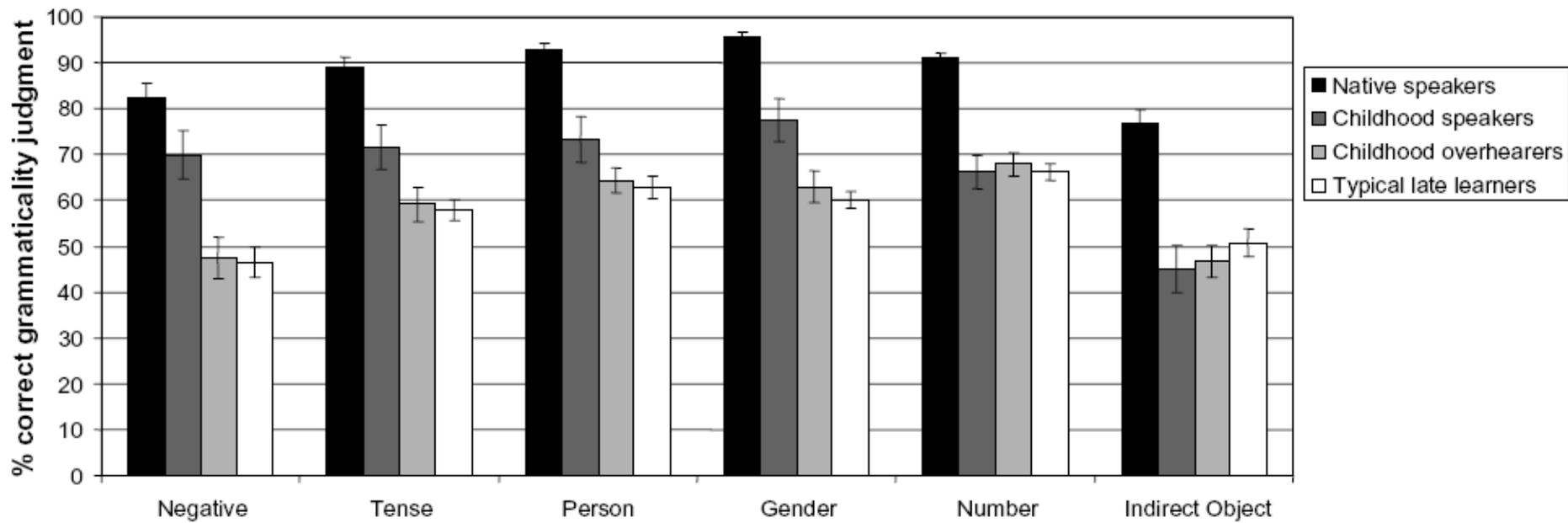


Fig. 1. Grammaticality judgment on different kinds of morphosyntactic markers.

# Conclusion

- Early childhood use of language does have an effect later in life, even after many years of disuse.