

Perceptual Sensitivity to Sonority in Visual Language: Native Signers & Naïve Infants

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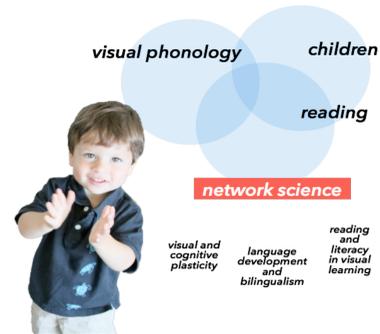
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CENTER SYNERGY



SFA 1: Visual and Cognitive Plasticity

Theme 1: Experience Dependent Changes

Theme 3: Visual Sign Phonology

QUESTION & RATIONALE

Is sensitivity to visual sonority, a type of rhythmic-temporal phonological patterning in visual language, present early in life and shaped by language experience?

- Sonority: perceptually salient changes in amplitude (sound: loudness; visual: movement) (Brentari, 1998; Jantunen & Takkinen, 2010)
- Hearing infants and adults universally prefer well-formed speech syllables based on sonority constraints, even in unknown or artificial languages (Berent, Harder, & Lennertz, 2011; Gomez et al., 2014), suggesting this sensitivity is innate.
- It is unknown if sonority-based linguistic preferences extends across modalities or depends on language experience
- Because visual sonority is based on rhythmic-temporal patterning, sonority is also useful for investigating the acquisition of visual sign phonology

HYPOTHESES & PREDICTIONS

Hypothesis: Sensitivity to visual sonority is present early in life (i.e. innate) and is maintained by signed language exposure during development.

Predictions: Young infants who have not been exposed to sign language are nevertheless predicted to show sensitivity to visual sonority, and this sensitivity is maintained in adult signers, but declines in older infants and adults who are not exposed to sign.

Alternative Hypothesis: Sensitivity to visual sonority is a function of language experience only; sign experience is required to gain sensitivity to phonological rhythmic-temporal patterning.

Predictions: Young sign-naïve infants will not show any sensitivity to visual sonority. In adults, only those who know sign will discriminate stimuli based on sonority differences.

ADULT STUDY

PARTICIPANTS

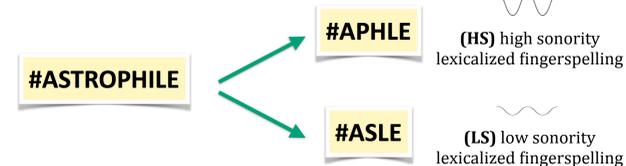


Signing adults (n = 35)



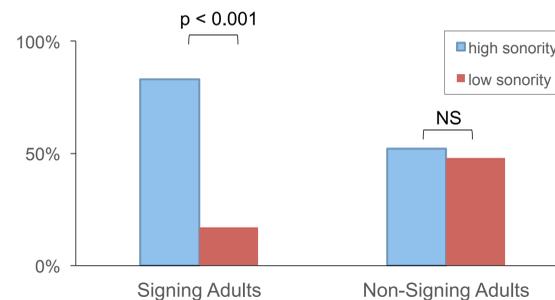
Non-signing adults (n = 52)

TASK



Participants watched unknown fingerspelled words, and then chose from one of two possible lexicalized versions

RESULTS



Signing adults strongly preferred HS over LS variants, indicating ability to discriminate based on sonority. Non-signing adults failed to discern a difference between HS and LS fingerspelling variants.

Sonority discrimination is a function of language experience, but is it present in early life?

INFANT STUDY

PARTICIPANTS



Younger sign-naïve infants (n=15, mean age = 5.6 mo.)

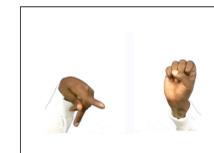


Older sign-naïve infants (n=12, mean age = 11.9 mo.)

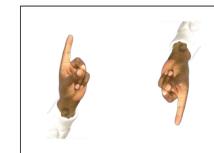
TASK



Tobii X120 Eye Tracking UCSD Infant Vision Lab

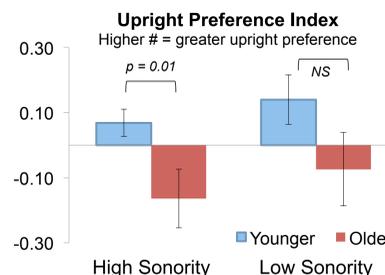
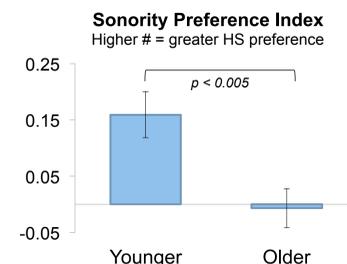


HS v. LS



Upright v. Inverted (both HS, or both LS)

RESULTS



Sensitivity to sonority is present early in life and is sustained with language experience.

Strong attraction to natural linguistic stimuli overrides novelty effect in younger infants, but not in older infants.

CONCLUSION

- Adults' perception of sonority is based on language experience and is not a general perceptual ability
- Perception of visual sonority is present by 4-6 months in sign-naïve infants, and hence, possibly innate
- Infants are initially sensitive to both visual and aural sonority, while experience narrows this sensitivity to within one's native language modality
- Younger infants have a peaked sensitivity for natural language signals with high sonority transitions
- Sign language experience is necessary to sustain initial sensitivity to visual sonority

TRANSLATIONAL SIGNIFICANCE

These findings shed light on how young infants discover visual sign phonological units in visual language. Visual sonority, a core component of rhythmic-temporal patterning and thus visual sign phonology, might be important in visual language acquisition. Sonority changes may orient infants' attention to human language input, from which they may extract phonetic-syllabic units from the linguistic stream (Baker, Golinkoff, & Petitto, 2006) and begin computing systematic statistical patterns en route to learning language.

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