Adapting infant looking time paradigms for the web

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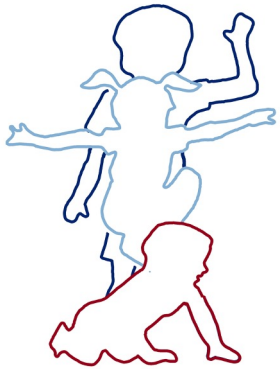

Investigating infants' linguistic knowledge

- How to study infants' linguistic knowledge?
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- Difficulty: They do not talk (much).
- An important technique: Measure their visual attention.

HPP paradigm

Head-turn preference procedure (HPP):

- crucial to the study of infant language acquisition.

(Central-fixation)

Photo credit: Baby Speech Lab, University of Konstanz

(Nelson, Jusczyk, Mandel, Myers, Turk & Gerken, 1995)

HPP paradigm

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- crucial to the study of infant language acquisition.
- measures how long infant's attention is held by sound sequences relevant to the language they are learning.

(Central-fixation)

Photo credit: Baby Speech Lab, University of Konstanz

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Some infant looking time paradigms have been adapted online (e.g., preferential looking: Scott, Chu & Schulz, 2017);

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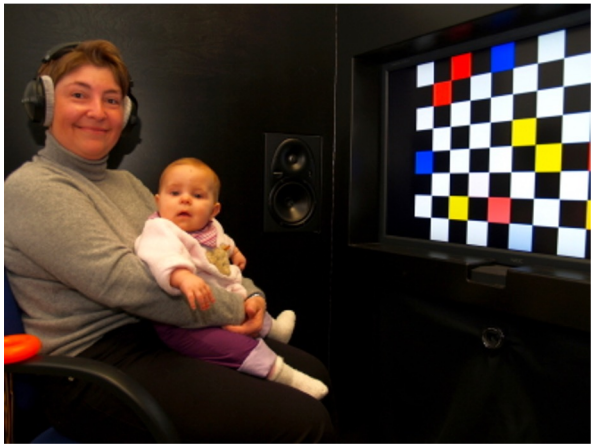
They may be true, but the pandemic gave us an opportunity to try the online study out anyway.

Current study

Today:

- the first demonstration that HPP can be adapted online using Lookit (https://lookit.mit.edu/).
- new opportunities for infant studies during the pandemic and in the future.



Current study

An online replication of Shi et al.'s (2006) Experiment 1.

- A robust study, likely to replicate.

Shi, Rushen; Cutler, Anne; Werker, Janet; & Cruickshank, Marisa. (2006). Frequency and form as determinants of functor sensitivity in English-acquiring infants. *The Journal of the Acoustical Society of America*.

Shi et al. (2006): Design

Can 11-month-olds use functors like ‘the’ to facilitate the extraction of novel nouns?

Familiarization - 6 trials (fixed length - 16s)

Test - 4 trials (fixed length - 16s)

functor + pseudoword

“the breek…the breek…”

“kuh tink…kuh tink…”

“the breek…the breek…”

“kuh tink…kuh tink…”

counterbalanced

pseudoword (alone)

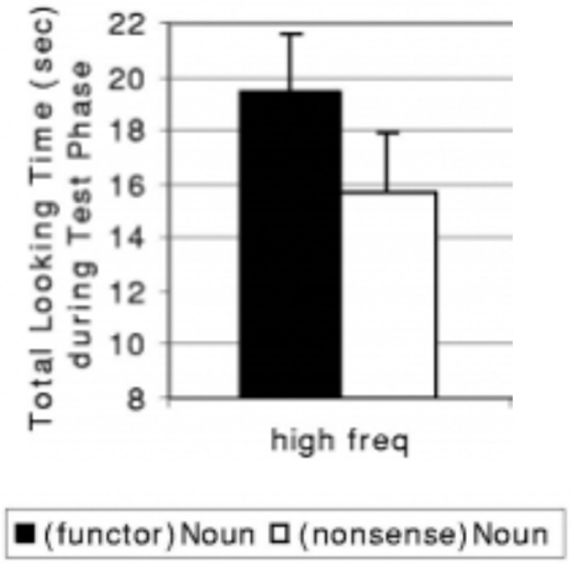
“breek…breek…”

“tink…tink…”

“breek…breek…”

“tink…tink…”

Shi et al. (2006): Results



‘The’ but not ‘kuh’ facilitated 11-month-olds’ extraction of novel nouns.

Current study: Design

	Shi et al. (2006) In lab	Current study Online via Lookit
Setup	Sound-attenuated chamber	Home over the web

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	Shi et al. (2006) In lab	Current study Online via Lookit
Setup	Sound-attenuated chamber	Home over the web
Parent blinding	Masking music over headphones	None (Compliance is unlikely in an unsupervised online study.)

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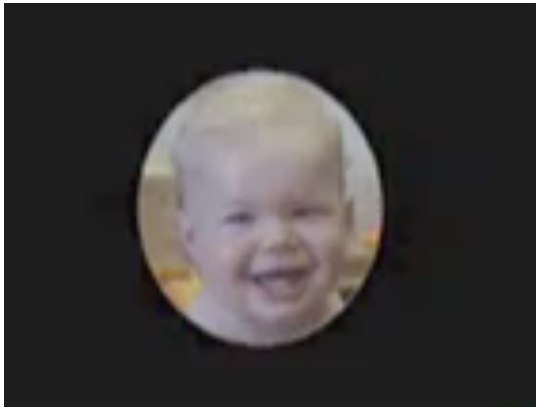
Setup	Sound-attenuated chamber	Home over the web
Parent blinding	Masking music over headphones	None
Attention getter	None reported	Laughing baby video after each trial



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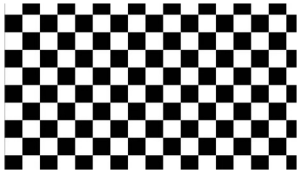
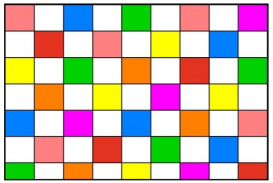
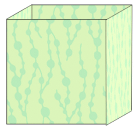
Trial length	Fixed 16s	Fixed 16s
Visual stimuli	Checkerboard	Checkerboard (low interest) or toy-in-box (high interest)





From Dr. Casey Lew Williams



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Visual stimuli	Checkerboard	Checkerboard (low interest) or toy-in-box (high interest)
Exclusion criteria	Fussiness; equipment failure; infant failed to reach 15s of cumulative looking for each token during familiarization	As in Shi et al (2006) *plus* unusable video (e.g. baby not visible in webcam recording)

Current study: Participants

62 11-month-old infants:

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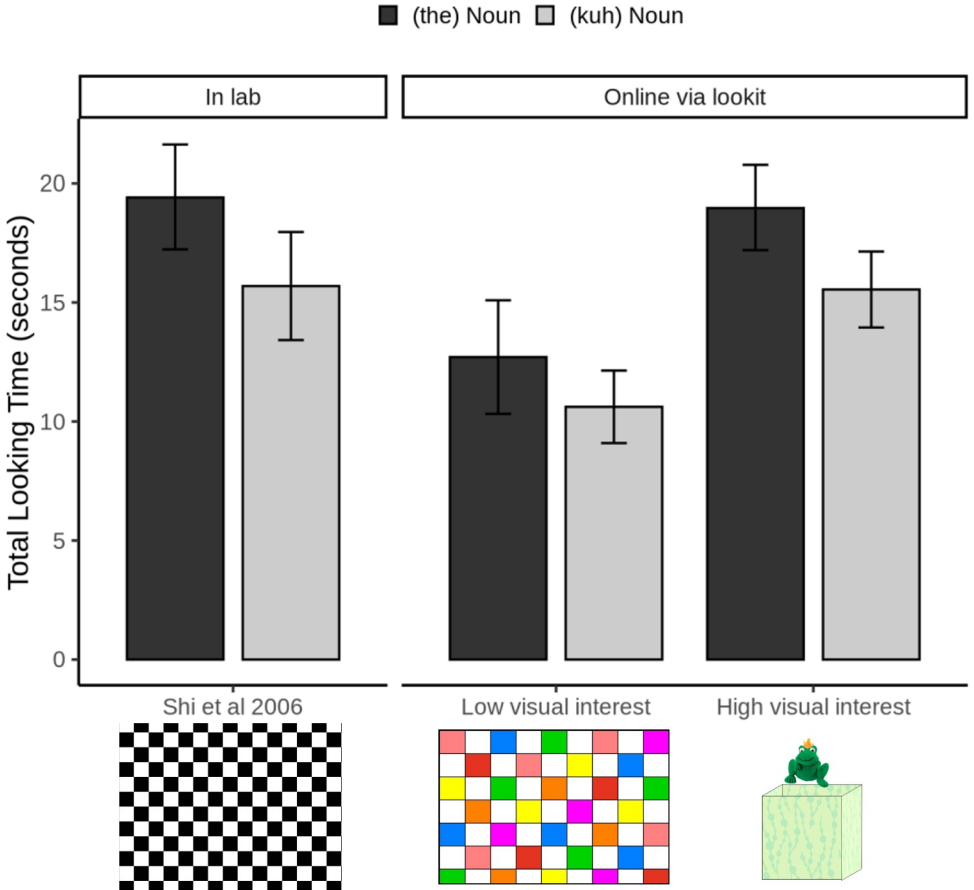
62 11-month-old infants:

- 14 in the low interest condition, 29 in the high interest condition
- 19 excluded:
  - 10 didn't finish the study or withdrew their consent; 4 had unusable video recordings; 5 failed the familiarization
  - Comparable to Shi et al. (2006): 34 participated, 10 excluded


little
SPEEDSTER

Current study: Results



Current study: Results

Fixed effects	looking (s) ~ functor * condition				
	β	SE	t	p	
(Intercept)	14.458	1.230	11.755	<0.001	***
Functor - the	2.757	1.334	2.067	0.045	*
Condition - High visual interest	5.594	2.460	2.274	0.028	*
Functor x Condition	1.331	2.668	0.499	0.621	

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- Functor and condition, but not their interaction were significant predictors of looking time.
- Infants in high interest condition looked longer overall, but we replicated Shi et al. (2006) in both conditions: Infants looked longer to novel nouns familiarized with ‘the’.

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Difficulties overcome:

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It might be possible to relax some of these constraints in order to be able to conduct such studies online.

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- As well as for the future, since babies and their families may be more likely to participate from home (more convenient and comfortable).
- Theoretically, access to a globally diverse population.

Thank you!

Thanks to

Dr. Rushen Shi for consulting on the study;

Dr. Casey Lew Williams for sharing the checkerboard;

Kidd, Piantadosi & Aslin (2014) for toy-in-boy and laughing baby videos;

Members of the Child Language Lab, Language & Cognition Lab, and Language Learning Lab at Penn;

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Questions?

Contact: daoxinli@sas.upenn.edu

Data coding

- The babies were coded with ELAN (the simple version).
- We code change of state: the precise timestamp when the babies stopped looking at the screen and when they looked back at the screen.
- We also get timestamps from the Lookit data, so we know exactly when the webcam started recording, and exactly when the audio started playing and when it stopped playing on each trial.

Lookit process

Before running a study:

1. Complete Lookit tutorial (~10 hours)
2. PI of lab must sign and return the institutional agreement (~a few days to 3 months)
3. Get IRB approval (depends on you; took us 3 weeks)
4. Create the study
5. Peer feedback via Slack (a few days to a few weeks)