

Diagnosing Participant Number with Syntactic Bootstrapping

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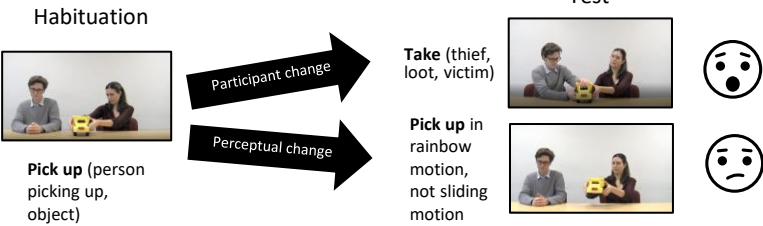
How do kids connect language to their perception of events? Potential mapping strategies:

PARTICIPANT ARGUMENT MATCHING: infants match the number of participants in an event to the arguments in a sentence
 Problem → Not all participants are necessarily mentioned in the sentence

THEMATIC LINKING – infants pay attention to argument positions and map them to participant roles
 Problem → Kids need to be capable of more than just counting

To test how verb learning works, we need to have situations where we know how infants are representing the particular scenes.
 So, what do babies pay attention to when observing events? How many participants do they represent when watching videos of **taking** versus **picking up** events? Or **jimmying** versus **opening** events?
 Using a dishabituation-switch paradigm, 10-month old infants viewed multiple events to see which changes caught their attention.

Take / Pick up

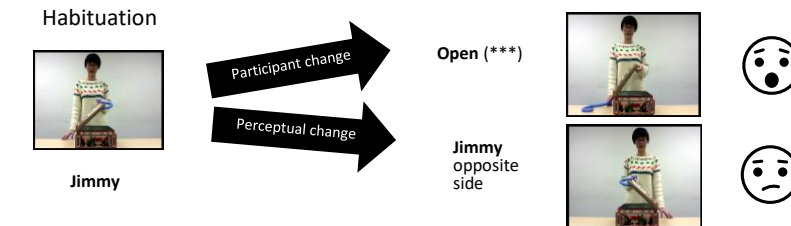


Infants dishabituated to participant change!

Now that we've established that babies see this video of a **taking** event with three participants, how will they think a transitive (two-argument) clause maps onto this events?

Next: Word learning task using the same videos

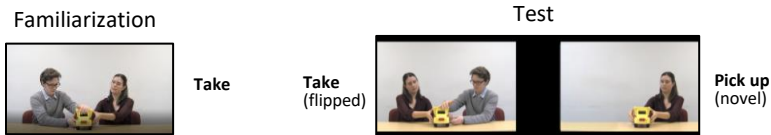
Jimmy / Open



It seems that babies also distinguish this video of **jimmying** as having three participants and the video of **opening** having two.

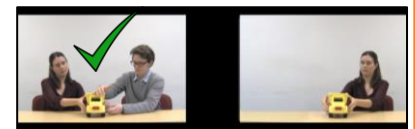
Next: Word-learning task with the same videos

Testing Bootstrapping Strategies: Introduce 20-month-old infants to a new transitive verb, *pim*, paired with a video of a **taking** scene. Then, they're shown a **taking** and a **picking-up** scene simultaneously. When asked to find the scene with *pimming*, where will they look?



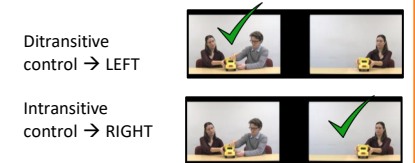
Familiarization	Test	Predictions				
Transitive "The girl <u>pimmed</u> the truck!"	"Find the one where she's <u>pimming</u> the truck."	<table border="1"> <tr> <td>PAM</td> <td>Pimmings are movings, so either scene is possible → novelty preference (RIGHT)</td> </tr> <tr> <td>Thematic linking</td> <td>Pimmings are takings, so only the taking scene is possible → shift away from novelty preference (LEFT)</td> </tr> </table>	PAM	Pimmings are movings, so either scene is possible → novelty preference (RIGHT)	Thematic linking	Pimmings are takings, so only the taking scene is possible → shift away from novelty preference (LEFT)
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Ditransitive control "The girl <u>pimmed</u> the truck from the boy!"	"Find the one where she's <u>pimming</u> the truck from him."	<table border="1"> <tr> <td>PAM</td> <td>Pimmings are takings (LEFT)</td> </tr> <tr> <td>Thematic linking</td> <td>Pimmings are takings (LEFT)</td> </tr> </table>	PAM	Pimmings are takings (LEFT)	Thematic linking	Pimmings are takings (LEFT)
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Intransitive control "The truck <u>pimmed!</u> "	"Find the one where the truck is <u>pimming.</u> "	<table border="1"> <tr> <td>PAM</td> <td>Pimmings are movings (RIGHT)</td> </tr> <tr> <td>Thematic linking</td> <td>Pimmings are movings (RIGHT)</td> </tr> </table>	PAM	Pimmings are movings (RIGHT)	Thematic linking	Pimmings are movings (RIGHT)
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Thematic linking	Pimmings are movings (RIGHT)					

Results:
 "The girl pimmed the truck! ... Find the one where she's pimming the truck!"

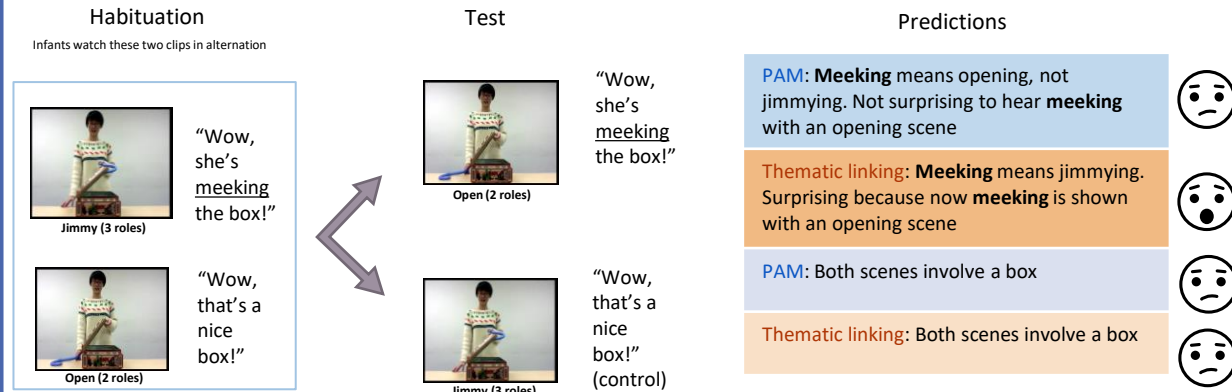


Infants interpret pimmings as takings

Consistent with thematic linking, not PAM



Testing Bootstrapping Strategies: Habituate 18-month-old infants to **three-participant video** and **two-argument audio** pair. How will they learn the novel verb *meek*? When switching the video, will they accept *meek* as an acceptable description of a two-participant event (opening), or will they be surprised?



Study still underway!

Conclusions (for now)
 Even though kids are succeeding at word-learning tasks very early in development, there is evidence that they are using the more complicated **THEMATIC LINKING** than the more simplistic **PAM!** They can learn a two-argument sentence corresponds to a three-participant event.

Future Steps

- If the 18-month-olds show evidence of using thematic linking, we can test the word-learning task with kids a little bit younger
- Children learning different languages would start out with the same ways of perceiving events → replication in other languages
- Look at 1-argument sentences labeling 2 and 3-participant events

Works Cited: Fisher, C., Gertner, Y., Scott, R. M., & Yuan, S. (2010). Syntactic bootstrapping. *Wiley Interdisciplinary Reviews: Cognitive Science*, 1 (2), 143–149. Perkins, L. (2019). *How Grammars Grow: Argument Structure and the Acquisition of Non-Basic Syntax* (Doctoral dissertation, University of Maryland). Lidz, J., White, A. S., & Baier, R. (2017). The role of incremental parsing in syntactically conditioned word learning. *Cognitive Psychology*, 97, 62–78. Naigles, L. R. (1990). Children use syntax to learn verb meanings. *Journal of child language*, 17 (2), 357–374. Pinker, S. (1989). *Learnability and Cognition: The Acquisition of Argument Structure*. Cambridge, MA: MIT Press. Williams, A. (2015). Arguments in syntax and semantics. Cambridge: Cambridge University Press. And many thanks to Mina Hirzel and Tyler Knowlton!