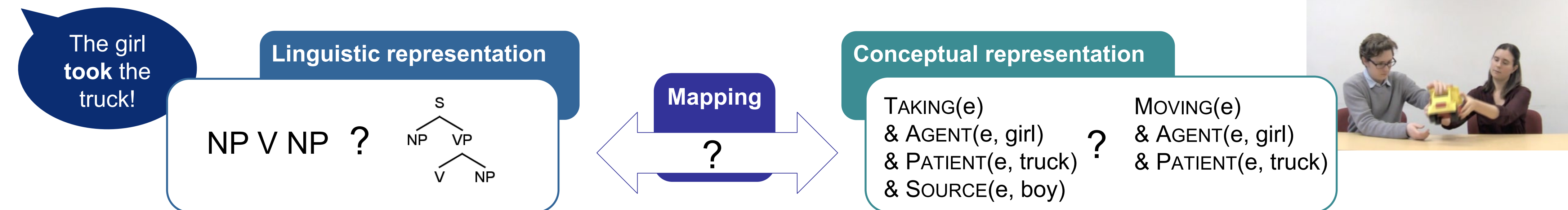


How do Infants Acquire Verb Meanings?

Infants exploit relations between linguistic and conceptual structure to infer the kinds of events a new verb can label [e.g. 1-3]

- ▶ But do they exploit relations between the **number** of arguments and participants [2-6], or between grammatical relations and thematic **roles** [8-15]?



Counting Arguments

Children expect the **number** of clause arguments to match one-to-one the number of perceived event participants [2-6]

- Transitive clause describes 2-participant event
- Intransitive clause describes 1-participant event
- ▶ Requires only the ability to count the number of NP arguments in a clause, but does not generalize widely within or across languages

- (1) The girl stole the truck.
- (2) St'át'imcets: Qám̓t kwskwimçxen hit.with.projectile det.NAME 'Kwimçxen got beamed.' [7]



Thematic Linking

Children expect particular grammatical relations to link to particular participant **roles** [8-9]

- Transitive subjects name agents and objects name patients
- Clauses describing a change realize the thing being changed
- Clauses describing an action realize the agent of that action
- ▶ More robust generalization within and across languages, but requires richer clause structure representations

Prior Work

Preferential looking/pointing studies find different patterns of behavior for different clause types [2, 4, 5, 10]

- Children prefer 2-participant events for transitive clauses
- Children do not reliably prefer 1-participant events for intransitive clauses

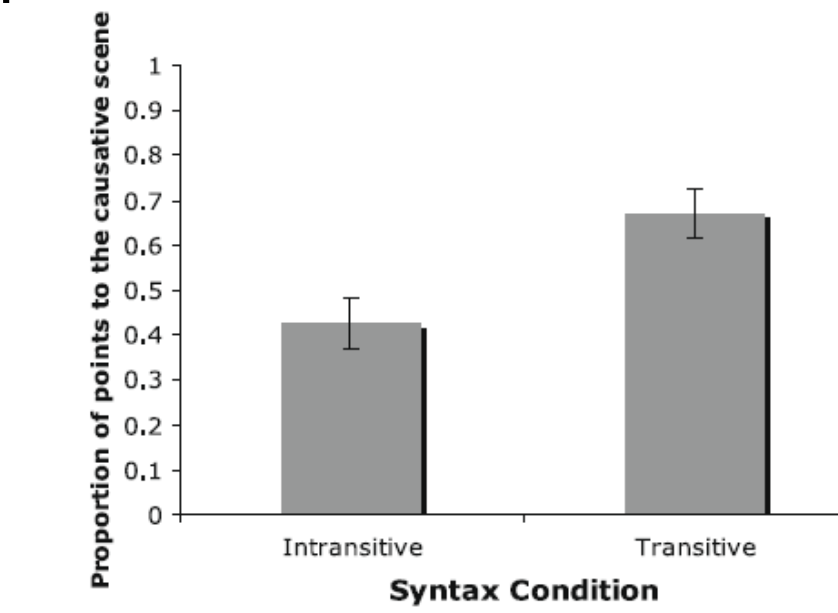
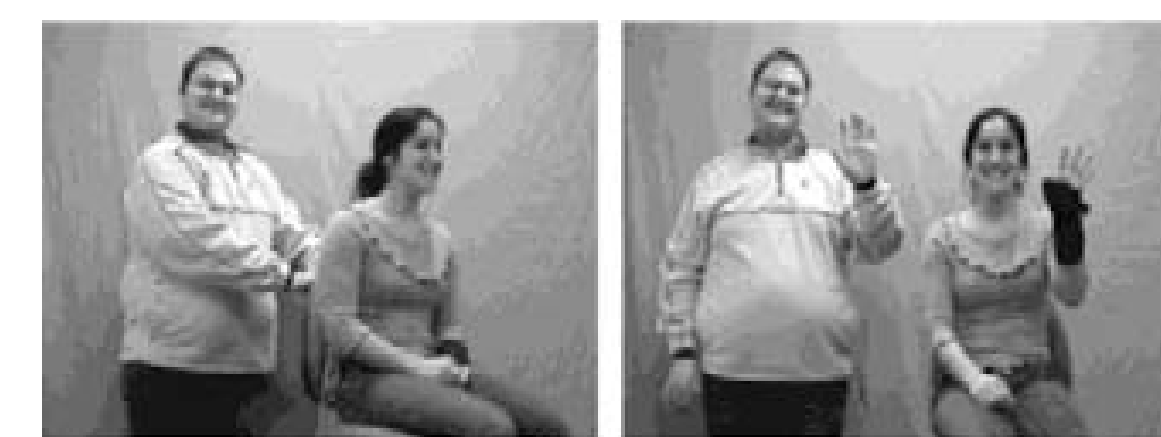
Can be explained under both **Counting** and **Thematic Linking**:

- **Counting**: children may perceive 1-participant events in intended 2-participant scenes (e.g. PLAYING), making them compatible with intransitive descriptions [4, 11]
- **Thematic Linking**: transitive clauses describe events with both agents and patients; intransitive subjects can name either agents or patients, so no preference predicted

- ▶ Prior work does not differentiate bootstrapping hypotheses

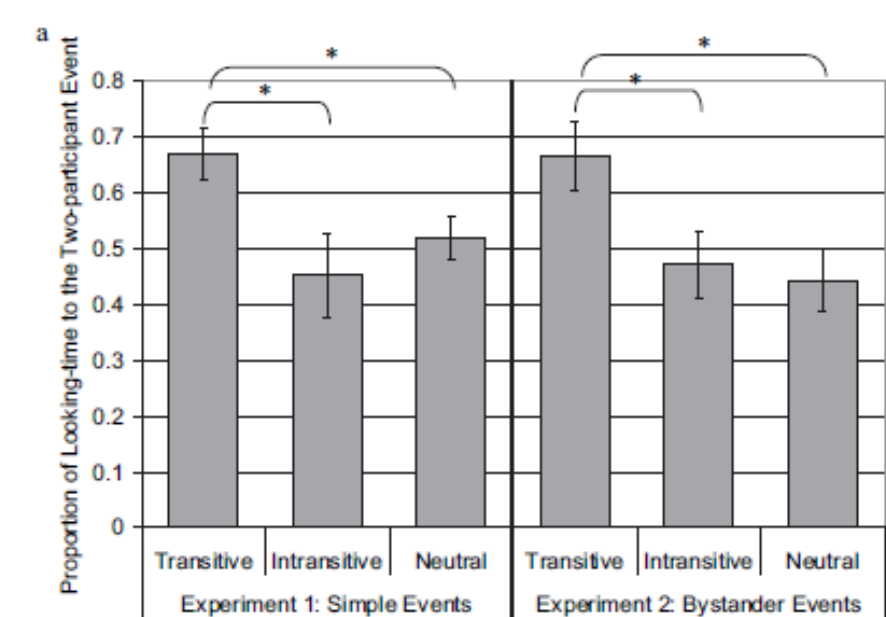
Arunachalam & Waxman (2010)

- (3) The boy is going to moop the girl.
- (4) The boy and the girl are going to moop.



Yuan, Fisher, & Snedeker (2012)

- (5) He's gorpung him.
- (6) He's gorpung.

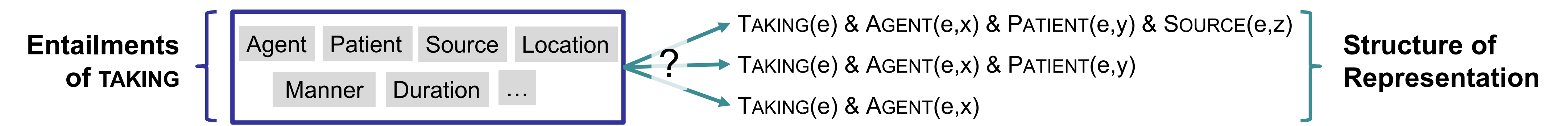


Current Goals

- ▶ Differentiating **number-based** from **role-based** bootstrapping hypotheses by evaluating how infants represent scenes as events (**Study 1**) and how they map sentences onto those representations (**Study 2**)
- ▶ Case study: events that are plausibly viewed with 3 participants, yet are readily described with transitive clauses

Study 1: Diagnosing Event Representations

An event concept **entails** many relations. Only some of these are **psychologically privileged**, explicit in the structure of the representation. Call these **participant relations** [8]:

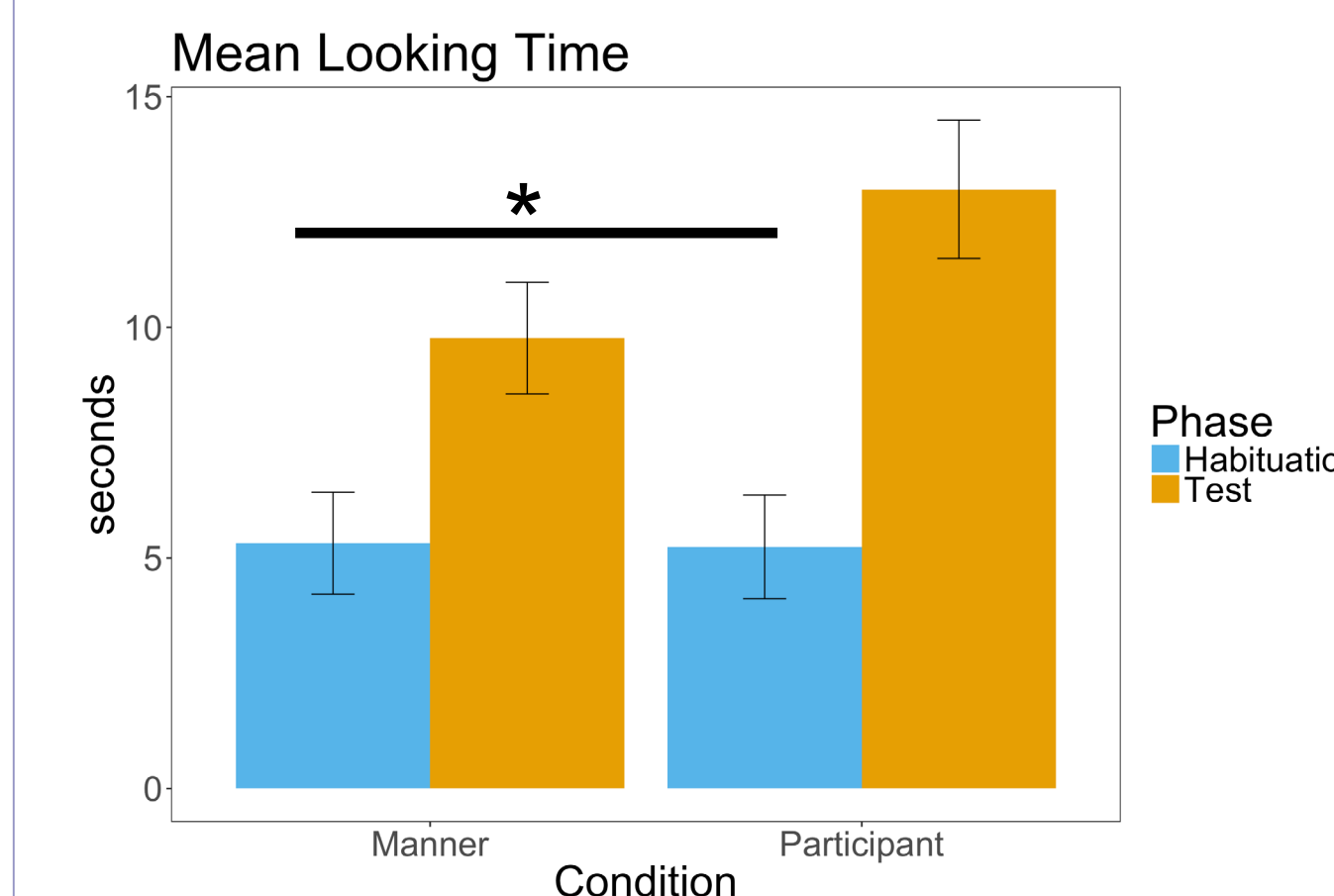
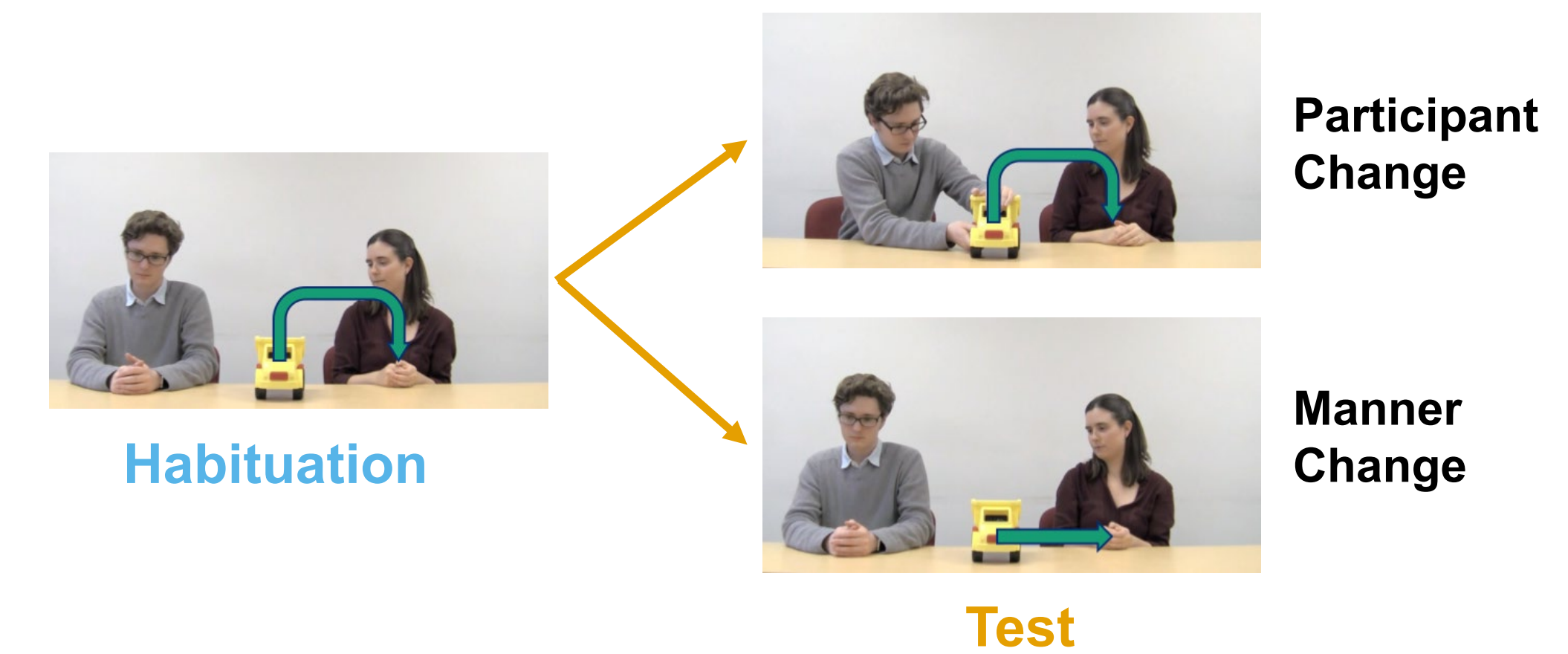


- ▶ For a given stimulus scene, which relations are privileged in the concept that infants view it under?

Habituation-Switch Task [12-13]

32 infants aged 9;21-12;15 (mean=10;23) habituated to a scene of a girl picking up a truck, with a boy sitting idly

- **Participant change**: girl starts taking truck from boy's grip
- **Manner change**: girl starts sliding truck instead of picking it up



Results

Infants dishabituate more when the boy is added as a participant than when manner of motion is changed, even though the manner change is more perceptually salient ($F(4,30)=5.42, p<.03$)

- ▶ Infants, like adults, view our taking scene under a concept with the boy filling a psychologically privileged role: TAKING(e) & AGENT(e, girl) & PATIENT(e, truck) & SOURCE(e, boy)

Study 2 (Ongoing): Evaluating Mapping Strategy

- ▶ If infants readily view our taking scene under a 3-participant concept, how will they map a transitive clause to that representation?

Verb Extension Task [14]

Infants aged 19;0-21;0 are familiarized to taking scene paired with a transitive clause containing a novel verb (*pim*)

- **Counting** leads learner to conclude that *pim* must describe a 2-participant event involving only the girl and the truck, e.g. MOVE
- **Thematic Linking** allows learner to pair *pim* with the 3-participant concept under which they readily view this scene, predicting that they will think *pim* means TAKE

At test, infants are asked to find *pimming* in context of taking video and moving video

- **Counting** predicts no preference: both videos show girl moving the truck
- **Thematic Linking** predicts preference for taking video

Preliminary Results

Partial sample of 15 subjects (target $n=24$) suggests preference for TAKING

- Marginally significant increase in looks to TAKING compared to baseline preferences before test prompt (Wilcoxon signed rank test $p<0.08$)
- Control comparisons (ongoing): *She pimed the truck from him* should describe TAKING, *The truck pimed* should describe MOVING under both hypotheses

- ▶ Full results will diagnose whether infants use **number-based** or **role-based** mapping when two strategies would lead to different inferences about verb meaning

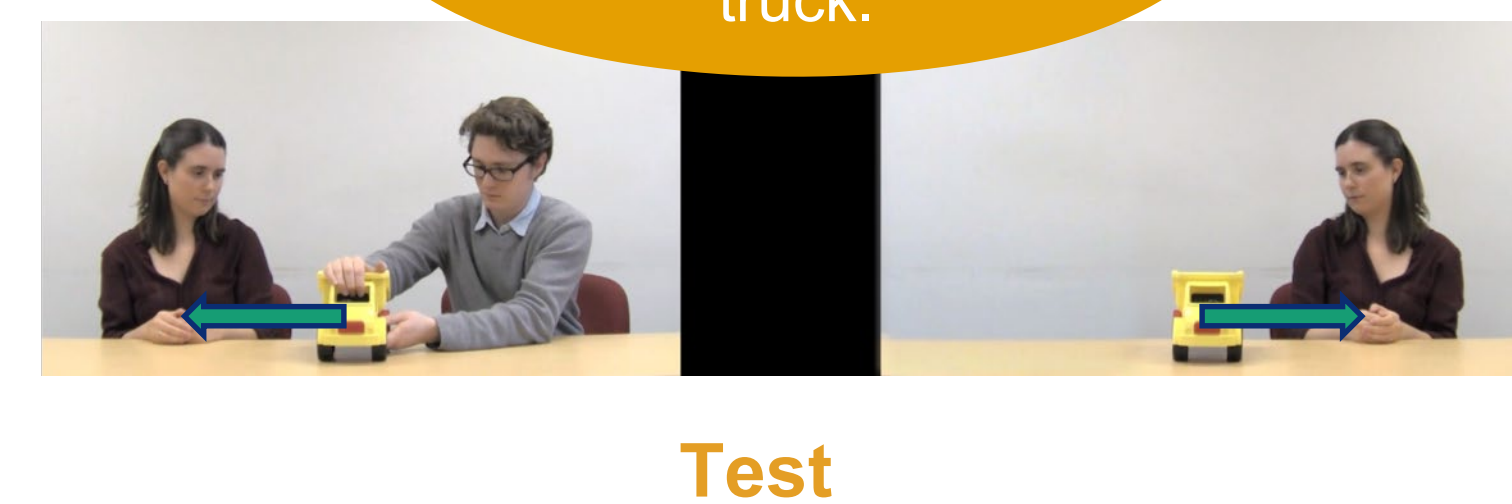
Future Directions

- ▶ Will infants use the same strategy to map sentences to other 3-participant event concepts, e.g. opening with an instrument [13]?
- ▶ Can infants bootstrap from "non-basic" clauses, e.g. wh-object questions?

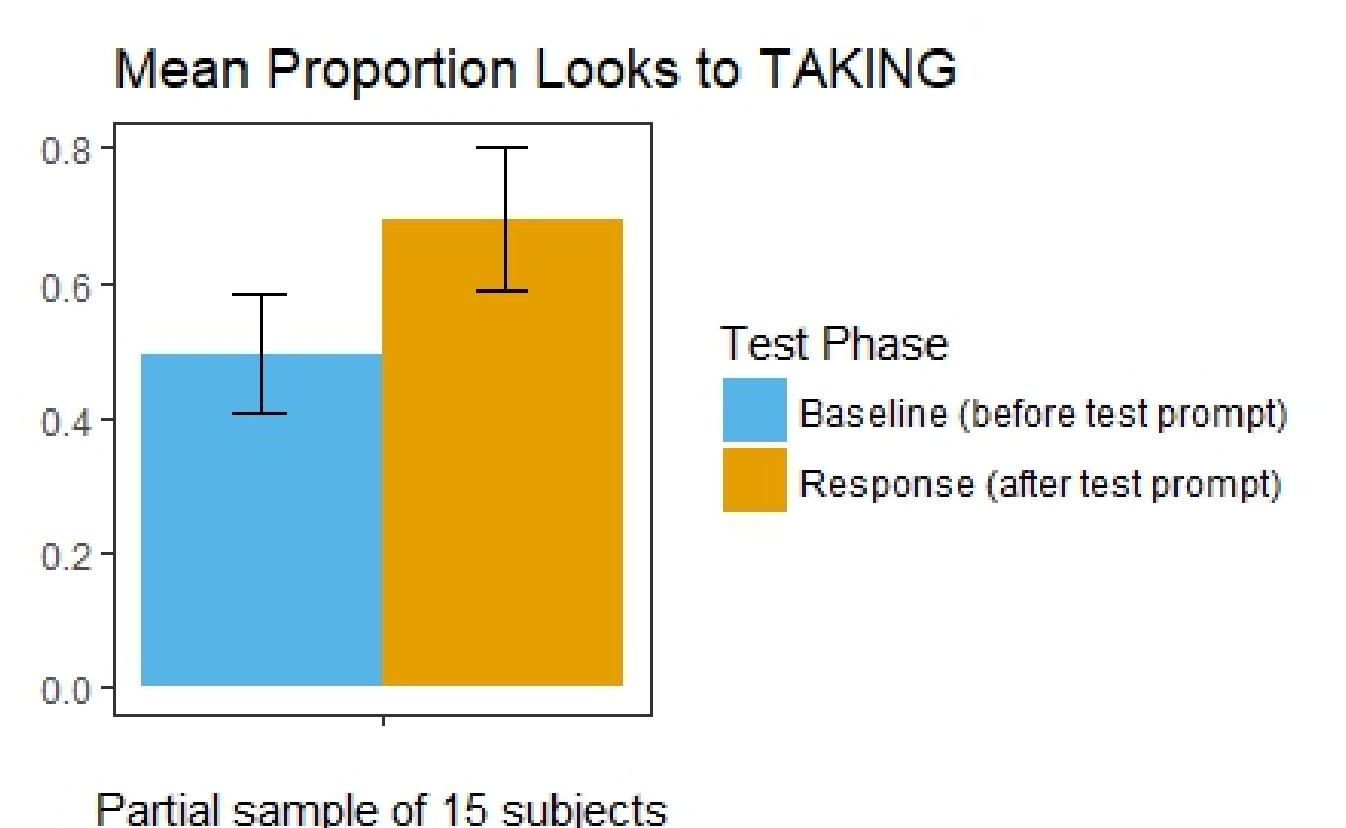


Familiarization

Find the one where she's pimming the truck.



Test



Partial sample of 15 subjects