Matching Number vs. Linking Roles: Using 3-Participant Scene Percepts to Understand Infants’ Bootstrapping
Laurel Perkins, Tyler Knowlton, Alexander Williams, and Jeffrey Lidz
University of Maryland, College Park

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

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

Prior Work

Preference 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

Current Goals

- Differentiating number-based from role-based bootstrapping hypotheses by evaluating how infants represent scenes as events (Study 1) and how they map percepts 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 [5]:

- Actor
- Patient
- Source
- Location
- Duration
- Manner
- Change
- Source
- Target
- Instrument
- Theme
- Goal
- Instrument
- Tool
- Location
- Path

The girl took the truck!

NP V NP ?

Linguistic representation

Mapping

Conceptual representation

TAKING(e) & AGENT(e,girl) & PATIENT(e,boy) & SOURCE(e,truck)

MOVING(e) & AGENT(e,girl) & PATIENT(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

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?