Language Development of Goal Spatial Prepositions

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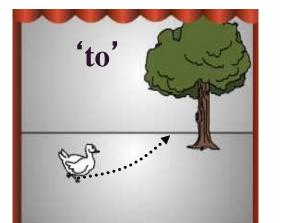
BACKGROUND
MOTION EVENTS

- **What are goal and source paths in language?**

  ➢ **Goal path:** Events that depict a figure moving towards another object that is its end point. (e.g., The duck walked *to* the tree).

    ➢ In English goal paths are marked with prepositions such as "to", "in", "on", "into", "onto" (Jackendoff, 1983*)*.

The duck walked into the box.
$[_{EVENT} [GO_{SPATIAL} ([duck] [INTO (box)]]$
Goal

The duck walked to the tree.
$[_{EVENT} [GO_{SPATIAL} ([duck] [TO (tree)]]$
Goal

The duck walked on the box.
$[_{EVENT} [GO_{SPATIAL} ([duck] [ON (box)]]$
Goal

The duck walked next to the mailbox.
$[_{EVENT} [GO_{SPATIAL} ([duck] [NEXT TO(mailbox)]]$
Goal

- **Goal paths in semantic structure are broad and abstract**

  ➢ Goal paths extend to events with different spatial relations: next to, into, onto

  ➢ Goal paths extend to events in a variety of domains: manner of motion, attachment, change of state, transfer (Jackendoff, 1990).

PAST FINDINGS

➢ "On" refers to "x" on "y" where "x" is juxtaposed or contiguous with "y" on a one-dimensional line or two-dimensional surface (Beitel et al., 2001).

  ➢ "On": Children 15 to 24 months show comprehension of goal preposition "on" (Meints et. al, 2002).

➢ "In" refers to the relationship of enclosure, with the inclusion of "x" in "y" (Richards & Coventry, 2005)

  ➢ "In": Children 14 to 21 months show comprehension of goal preposition "in" for English and Korean (Choi & Bowerman, 1991)

    ➢ "Into" and "Onto": No data about child comprehension or production

➢ "To" implies motion along a physical path until the trajector reaches a physical goal (Smith, 2009).

  ➢ "To": No data about child comprehension or production

➢ 12 month-old-infants privileged goal paths over source paths involving animate figures (Lakusta & Carey, 2015).

  ➢ In language, Goal paths are expressed significantly more often than source paths (Lakusta & Landau, 2005; 2012).

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RESEARCH QUESTION

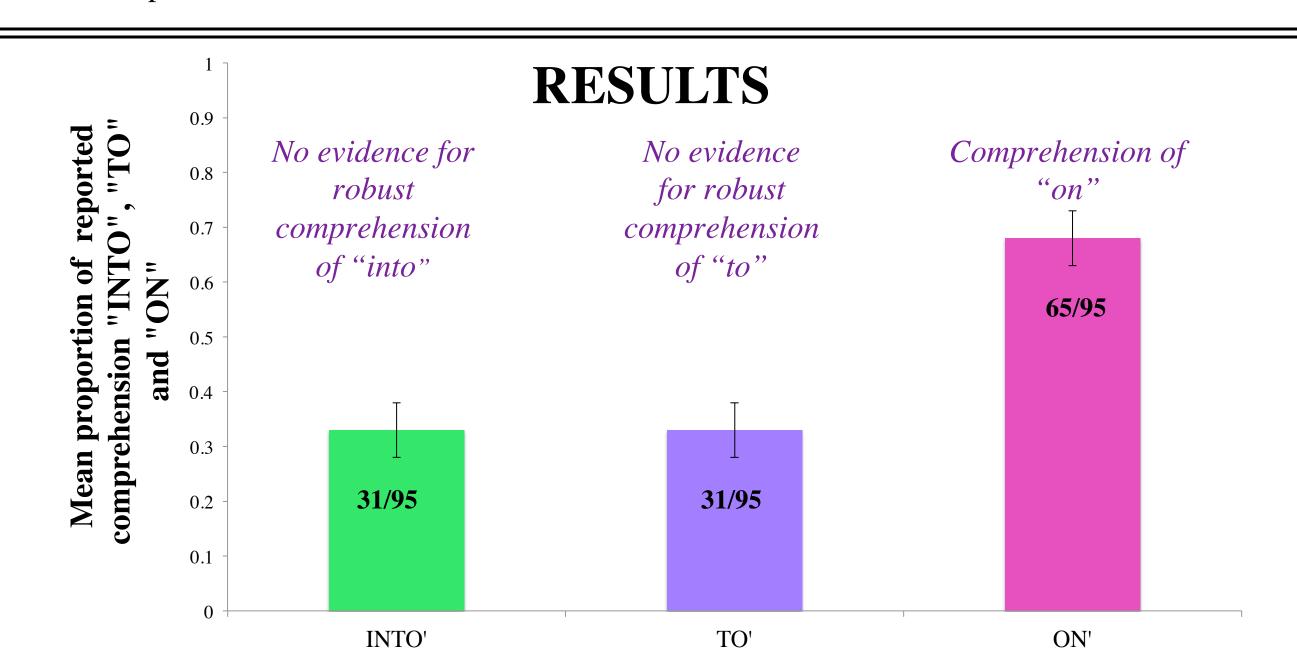*Do 18-month-olds comprehend "into" "on" and "to"?*

EXPERIMENT 1
Parent Report

Participants: 18-month-olds (18-month-olds: N=95)
Measurement: Modified MacArthur Communicative Development Inventory: Added select prepositions to the "Prepositions and Locations" section, including "to" and "into". Parents are asked to check off whether their infants understand, say, or sign different words.
- Goal path terms: to, on, into

RESULTS

No evidence for robust comprehension of "into"

No evidence for robust comprehension of "to"

Comprehension of "on"

Mean proportion of reported comprehension "INTO", "TO" and "ON"

31/95   31/95   65/95

INTO'   TO'   ON'

- Binomial test shows "on" is significant yes>no, p= .01, "into" and "to" are significant no>yes, p= .01.
- The Stanford Wordbank database, which shows collective statistics of MCDI, aligns with current results: at 18-months, 71% of infants are reported to comprehend of "on".
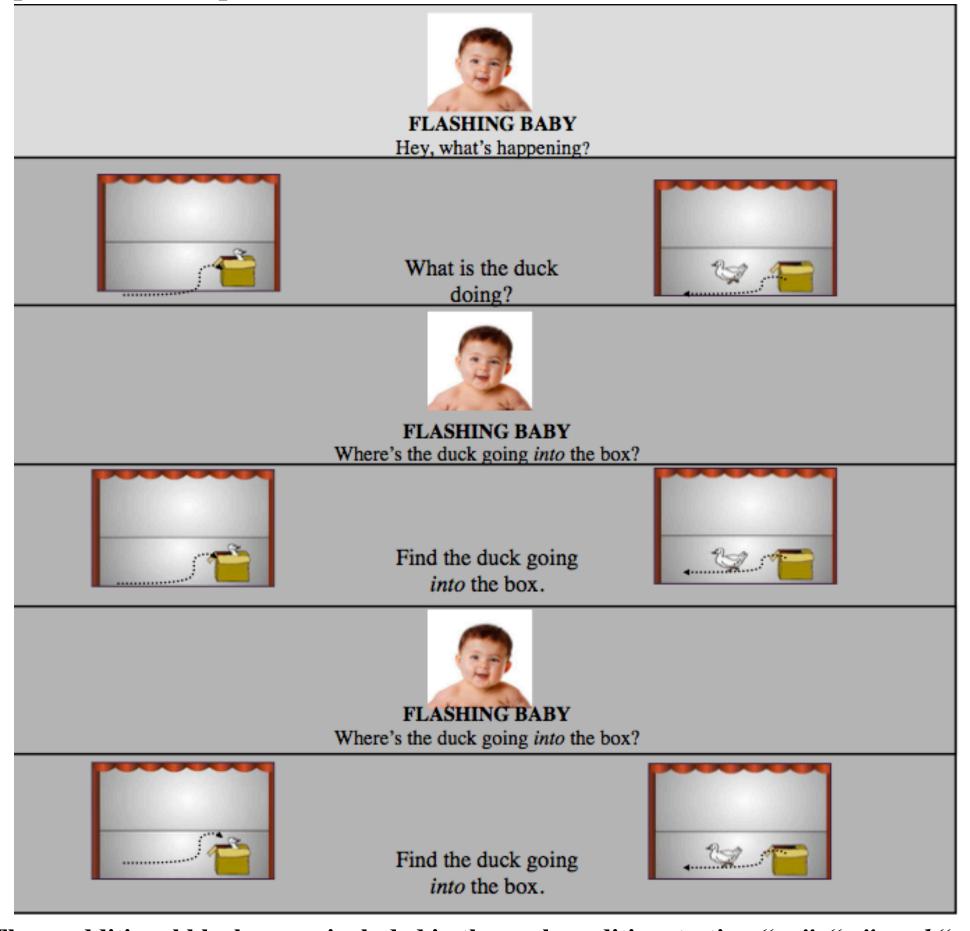
But… A discrepancy exists between parental reports and infant's knowledge of words (Houston-Price et al., 2007).

EXPERIMENT 2
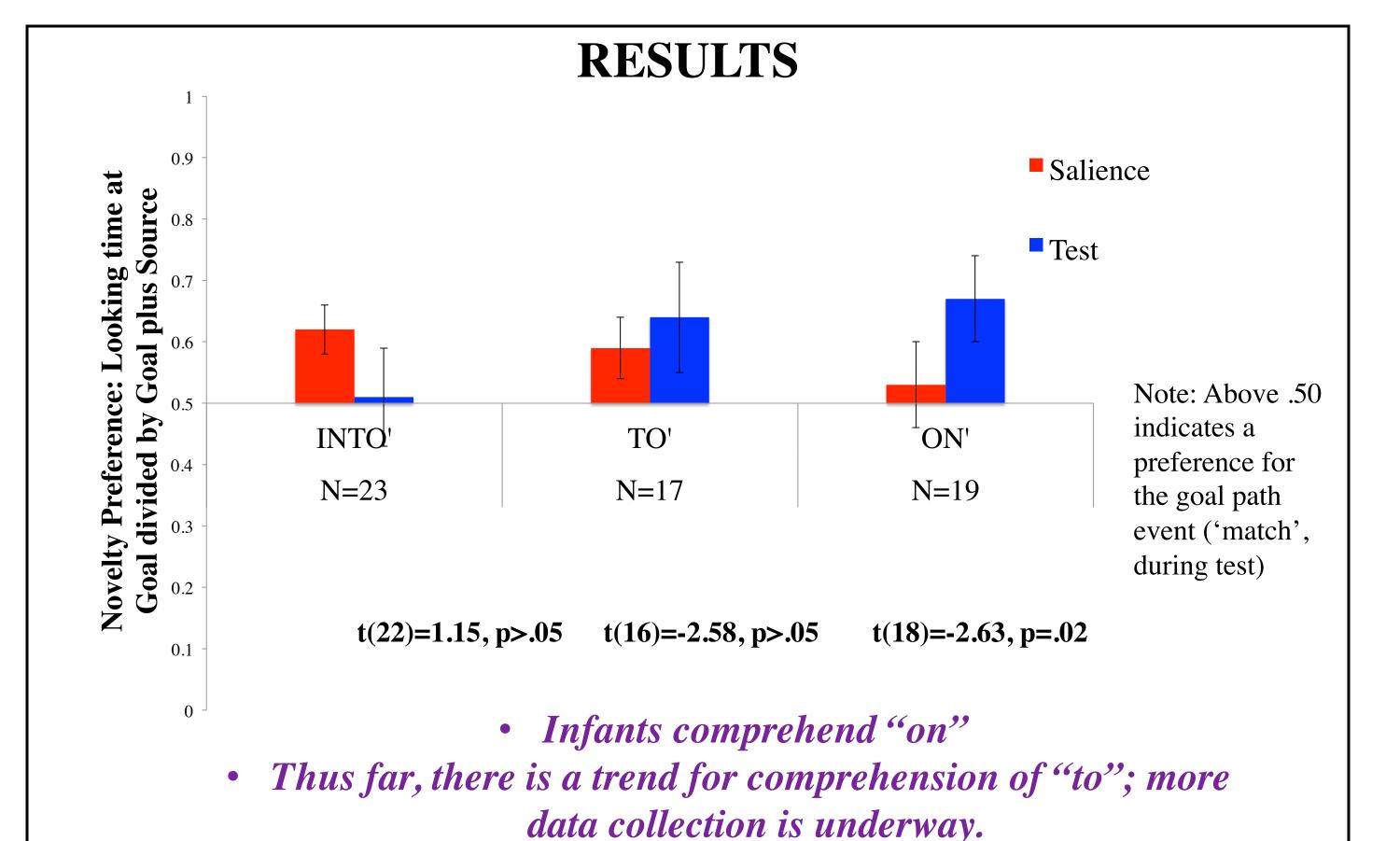### Intermodal Preferential Looking Paradigm

Participants: 18-month-olds
Design: Each condition contained four blocks, each block tested comprehension on the following prepositions (*into, to, on, next to*).
Dependent Variable: Infants looking directions and lengths of looks were coded and used as a measure of prepositional comprehension.

FLASHING BABY
Hey, what's happening?

What is the duck doing?

FLASHING BABY
Where's the duck going into the box?

Find the duck going into the box.

FLASHING BABY
Where's the duck going into the box?

Find the duck going into the box.

Note: Three additional blocks were included in the goal condition, testing *"on", "to", and "next to."*

RESULTS

Novelty Preference: Looking time at Goal divided by Goal plus Source

INTO'   TO'   ON'
N=23   N=17   N=19

Salience   Test

t(22)=1.15, p>.05   t(16)=-2.58, p>.05   t(18)=-2.63, p=.02

Note: Above .50 indicates a preference for the goal path event ('match', during test)

- *Infants comprehend "on"*
- *Thus far, there is a trend for comprehension of "to"; more data collection is underway.*

SUMMARY

- Infants comprehend "on" when it refers to a motion event. Consistency between MCDI, IPLP, and Wordbank.

- Infants do not comprehend "into" when it refers to a motion event. Consistency between MCDI and IPLP

  - Though there is a discrepancy between parent reports and infant's knowledge of words, IPLP suggests that parents have an accurate estimation of other spatial terms such as "on" and "into".

- Do infants comprehend "into" when this term refers to a spatial, goal-directed paths?

  - Infants show low comprehension of "into" because it is suggested that "into" is a more complex spatial term

    - Example: The mouse ran into the room. (Path TO ([Place IN ([Thing ROOM])])] (Jackendoff, 1983).

- Do infants comprehend "to" when this term refers to a spatial, goal-directed paths?

  - Parent report suggests 'no', but IPLP suggests 'maybe'.

- Note: The Parent Report gives no specific context for "to", and given the broadness of this term, this maybe be causing parents to underestimate their infant's comprehension.

FUTURE QUESTIONS

- Do parents underestimate infant's knowledge of complex spatial terms such as "into" and "onto"?

- If "to" was defined as a spatial term (e.g., the duck walked to the tree), would parents more accurately estimate children's comprehension of "to" compared to IPLP findings?

- Do children under 18 months comprehend "on" when it refers to a dynamic motion event?

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