28-month-olds use Inferred Thematic Relations to Bootstrap Intransitive Verb Meanings

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How do Learners Acquire Intransitive Verb Meanings?

Infants and toddlers use a verb's syntactic distribution to infer the kinds of events that it labels [1-9]

► Focus of most prior work: inferring causal meanings from transitive clauses [e.g. 2-5, cf. 6-8]
► Here: bootstrapping from **intransitive** clauses

The tower is *daxing*
The girl is *daxing*

daxings:
BREAKINGS
FALLINGS
PLAYINGS
…

Two Classes of Intransitives

Unaccusatives

(1) The tower is *falling / breaking*

- Sole argument has characteristics of a transitive object, names a patient
- Tend to describe **changes of state**

Unergatives

(2) The girl is *playing / crawling*

- Sole argument behaves like a transitive subject, names an agent
- Tend to describe **activities**

Distinction marked in overt morphosyntax in many languages, but not in English [11-13]

How might learners identify the class of a new intransitive verb in a language without overt morphosyntactic cues to the unaccusative/unergative distinction?

► **Hypothesis:** use **animacy** to infer thematic relation of clause argument [6-8]

| inanimate subject | → | likely patient | → | unaccusative, event of change |

Previous Findings

Bootstrapping from Sentences and Concurrent Scenes

24-month-olds show sensitivity to thematic relation of intransitive subject, when given accompanying scene illustrating possible referents [6-7]

E.g., given a scene where a girl bounces a ball:

- Subject labels patient (*The ball is pimming*) → event of change (BOUNCING)
- Subject labels agent (*The girl is pimming*) → activity of agent, no change (HITTING)

Bootstrapping from Sentences Alone

28-month-olds draw inferences from sentences *without* an accompanying referential context [8]

Use animacy of intransitive subject together with transitivity alternations

- Subject is inanimate, object of transitive clause → event of (caused) change
- Subject is animate, subject of transitive clause→ activity of agent, no change

Scott & Fisher 2009

► **Current study:** 28-month-olds can use animacy to bootstrap verb meanings (i) in the absence of referential context, and (ii) from intransitive sentences alone

Method

Dialogue-Based Preferential Looking Task [4-5, 8]

46 toddlers aged 27;2-29;5 (mean = 27;29) familiarized to novel verbs in two dialogue conditions (between-subjects):

- **Inanimate:** intransitive sentences with inanimate subject
- **Animate:** intransitive sentences with animate subject

Both groups tested on same pairs of side-by-side videos, asked to find referent of novel verb:

- Girl effects a change of state: e.g., breaks toy
- Girl performs activity that does not effect a change: e.g., wipes toy

For each child, two trials in same condition: different novel verbs (*dax, pim*), tested with different pairs of events (BREAKING/WIPING a toy, OPENING/JUMPING ON a box)

Phase	Familiarization (4 x 13-sec dialogues)	Pre-Test (8 sec)		Test (Videos on loop, 22 sec)
Video				
Inanimate Condition	- The toy is gonna *dax*. - Really? It's gonna *dax*?	Look at the girl and the toy!	There they are again!	Now look what's happening! Do you see *daxing*? Where's *daxing*?
Animate Condition	- The girl is gonna *dax*. - Really? She's gonna *dax*?			

Fig. 1 Trial Structure

Results

Logistic mixed-effects regression analyzing looks to change vs. activity video in 2-sec windows following each presentation of novel verb in test phase

Item effect: more overall looking to change video for BREAK/WIPE comparison than for OPEN/JUMP-ON comparison ($\chi^2(1) = 1383.2$, $p < 0.001$)

Significant three-way interaction of condition, window, and item ($\chi^2(1) = 24.87$, $p < 0.001$)

- For **inanimate** condition but not for **animate** condition, increase in looks to BREAKING vs. WIPING following second presentation of novel verb ($Z = 2.09$, $p = 0.04$)
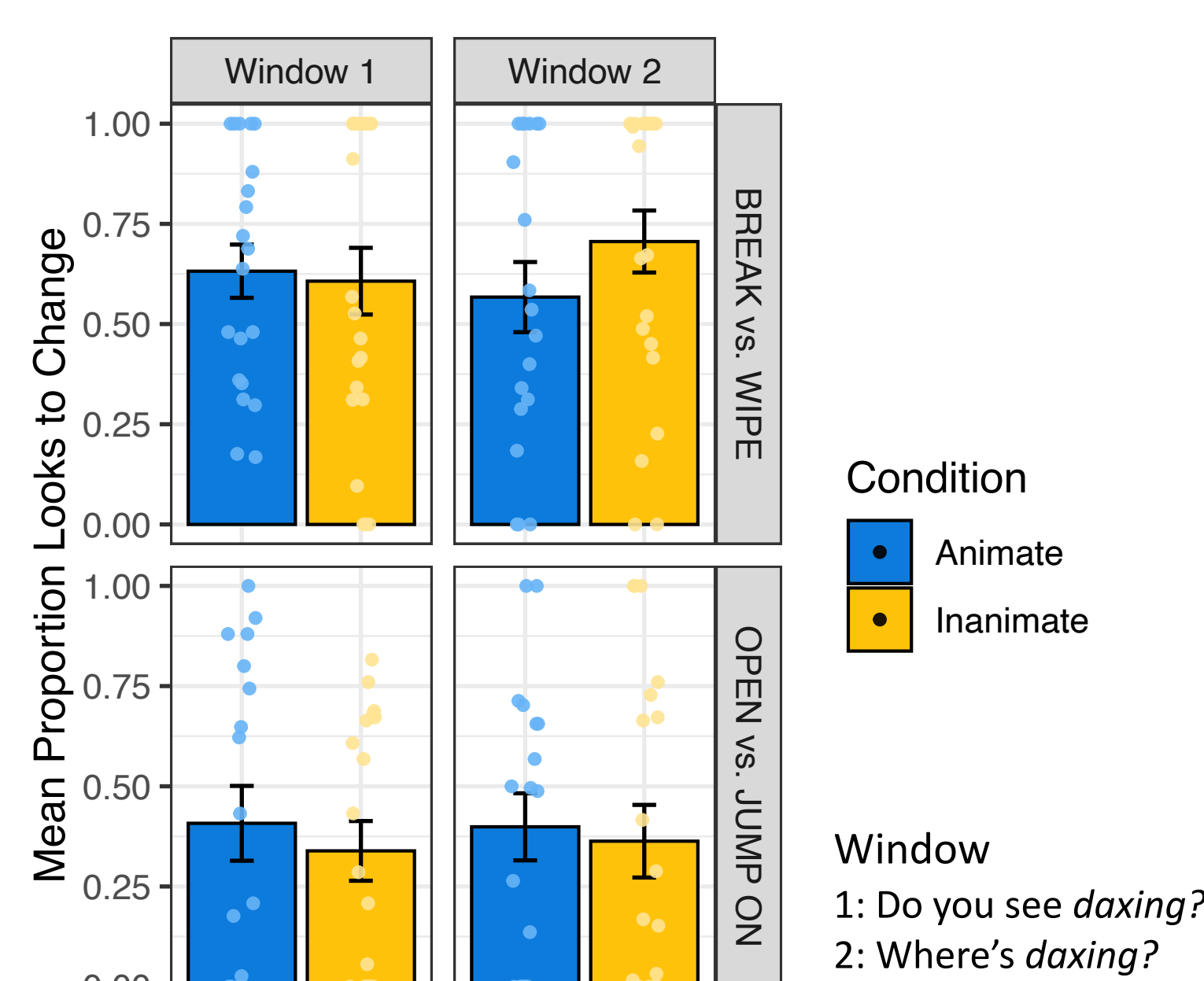- No increase in looks to OPENING vs. JUMPING-ON, for either condition

Fig. 2 Mean Looking Time by Condition, Test Window, and Item

► Toddlers who heard novel intransitive verb in dialogues with **inanimate** subject preferentially interpreted it as an event of change: BREAKING rather than WIPING

Discussion

We find that English-learning 28-month-olds can:

- Use animacy to infer thematic relation of intransitive subject
- Use thematic relations to infer whether a new verb labels a change (BREAKING) or an activity (WIPING)
- Even without concurrent referential context

► Awareness of correlations between intransitive argument structure & meaning: consistent with knowledge of the **unaccusative/unergative** distinction

Possible that toddlers represent clauses like (1) as underlyingly unaccusative and clauses like (2) as unergative, even though this distinction is not marked overtly in English

Contributes to literature on sensitivity to animacy and thematic content in grammar learning [6-9, 14-15]

Open Questions and Future Directions

1. Why do we see this behavior for only one of our two items: BREAK/WIPE but not OPEN/JUMP ON?

- Likely that the OPENING video was much less interesting compared to the JUMPING-ON video
- Future work: will this generalize to other events of change, with better-controlled materials?

2. In languages with overt morphosyntactic signs of unaccusativity, when can learners use those features as cues to verb class and meaning? [e.g. 16-18]

Spanish:

(3) *Post-verbal subjects:*
Mamá vino / Vino Mamá
'Mom came.'

(4) *SE clitic:*
El bosque *(se) quemó
'The forest burned.'

Spanish-learning 2-year-olds use these distributional features appropriately with verbs they already know [18]. Upcoming: whether they also use them when learning new verb meanings

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