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Toddlers Acquire Verb Transitivity in Non-Social Overhearing Contexts

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Toddlers acquire verb transitivity in non-social overhearing contexts

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Abstract

Acquiring word meanings is typically described as a social process involving live interaction and joint attention to the referent. However, the ability to learn meanings in *non-social* contexts could be useful in many overhearing situations, in which speech may not be child-directed, and learners may lack discourse and/or situational context. Is social context required to trigger toddlers' abilities to map verbs to meaning? We address this question in the following experiment. Our results indicate that 2-year-olds can acquire a novel verb's meaning even in socially impoverished contexts. This finding has implications for treatment of children with Autism Spectrum Disorders.

Introduction

How do children discover the meanings of words? We often describe this process as a social one, involving live interaction with an interlocutor and joint attention to the referent (e.g., Tomasello & Farrar, 1986; Roseberry et al., 2009; Krcmar et al., 2007).

But for verbs in particular, access to richly informative linguistic contexts can promote acquisition of a novel verb's meaning even without visual access to its referent (e.g., Arunachalam & Waxman, 2010; Arunachalam et al., in press; Scott & Fisher, 2009; Yuan & Fisher, 2009). In these studies, toddlers were overhearers of a videotaped conversation between two adults who used the novel verb.

Here we ask whether toddlers can acquire verbs in even more socially impoverished contexts, in which syntactic information is available, but a conversational context is not. Toddlers are presented:

- no discourse context
- no interlocutor (neither live nor videotaped)
- no visual referent for the novel verb
- no child-directed speech

Participants & Design

Participants: 36 toddlers (25.0 to 29.9 months, mean age 27.1 months)

4 trials, each consisting of:

- 1) Syntactic Familiarization: novel verb presented in one of two contexts
 - Transitive, e.g.,
The boy is going to lorp the girl, or
 - Intransitive (conjoined-subject), e.g.,
The boy and the girl are going to lorp

The sentences stream ambiently from a speaker while the toddler watches an unrelated video (animated shapes move on the screen) or plays quietly with toys (e.g., Lany & Saffran, 2011).

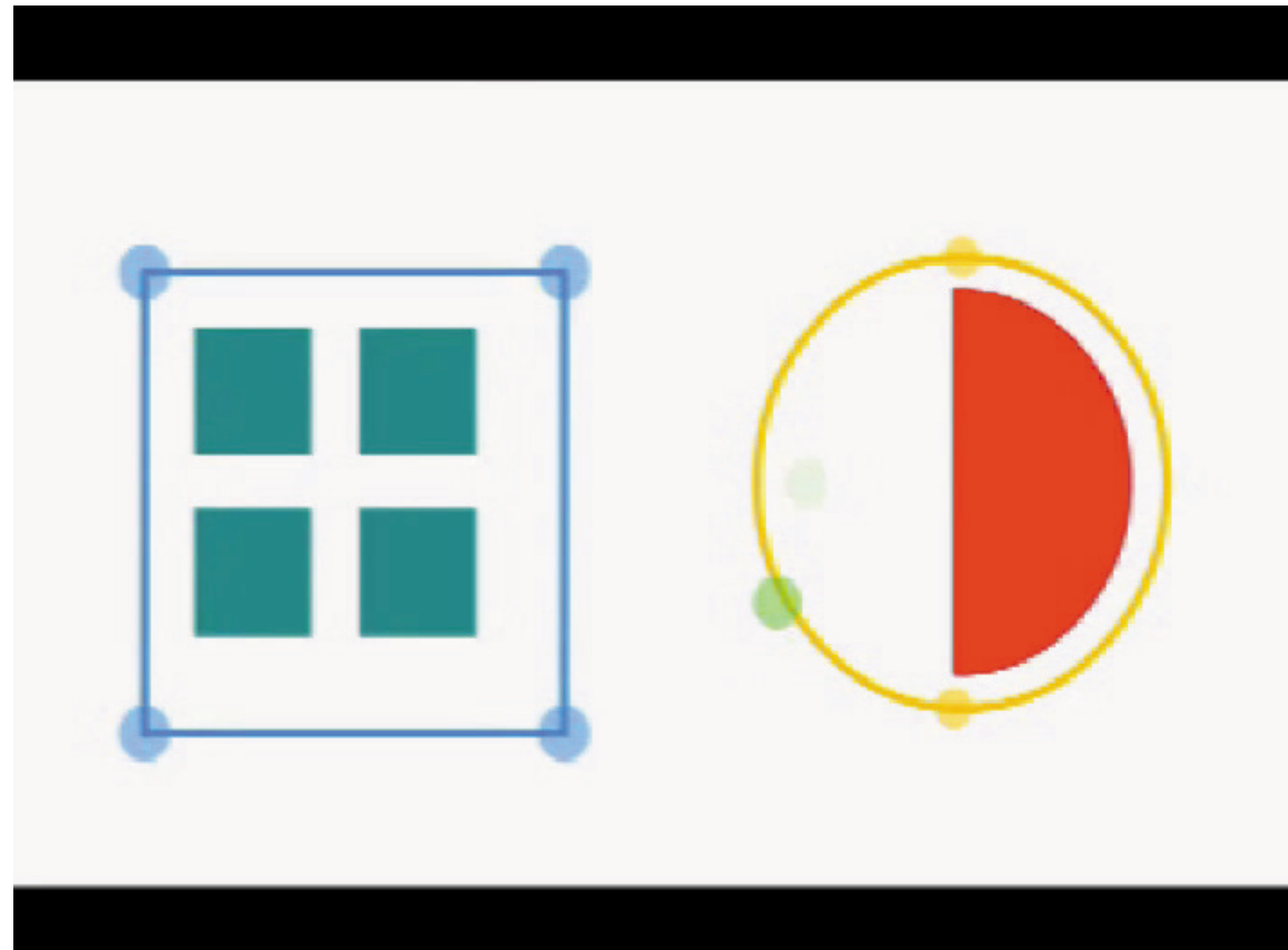
- 2) Test: 2 simultaneous dynamic video scenes
 - a causative action
 - a synchronous action

At test, toddlers hear, e.g., "Where's lorping?" Eye gaze is recorded (Tobii T60XL).

Sample Trial

Syntactic Familiarization (different across conditions)

Video: Animated shapes unrelated to audio



Audio: sentences streaming ambiently from speakers

Transitive Condition

The doctor lorped Daddy. The lion lorped the frog. Mommy lorped the girl. Elmo lorped Ernie. ...

Intransitive Condition

The doctor and Daddy lorped. The lion and the frog lorped. Mommy and the girl lorped. Elmo and Ernie lorped. ...

Test (identical across conditions)

SYNCHRONOUS



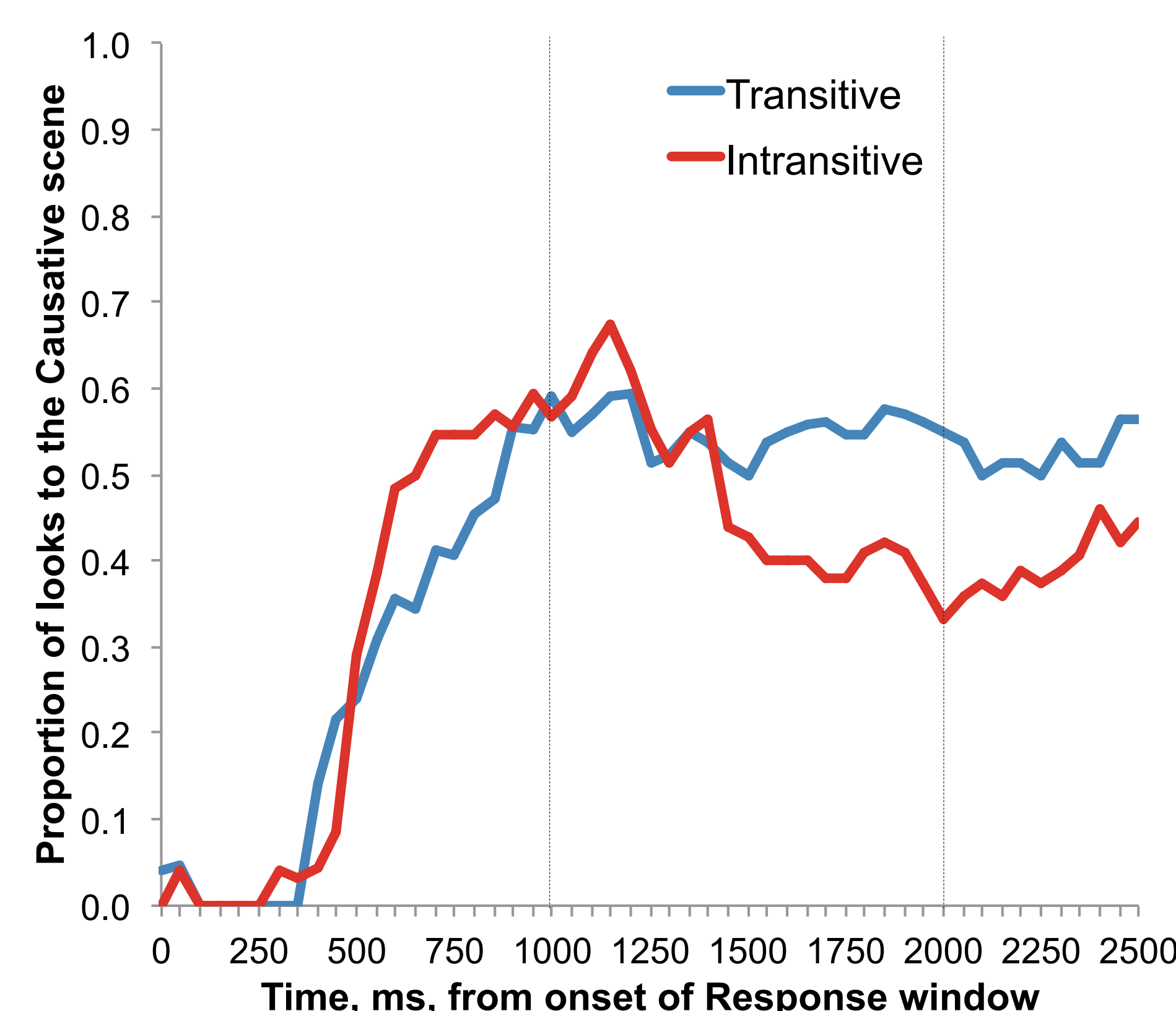
CAUSATIVE



Baseline window:
Look! Wow!

Response window:
Where's lorping?

Results



Based on previous work (Arunachalam et al., in press), we expected children's gaze in the two conditions to diverge beginning 1 sec after the onset of the Response window. Proportion of looks to the Causative Scene serves as dependent measure.

Toddlers in the Transitive Condition (N = 18) reliably prefer the Causative Scene compared to toddlers in the Intransitive Condition (N = 18) from 1 to 2 sec of the Response window ($t(34) = 2.4, p < .03$).

Multi-level logistic regression models reveal the same pattern: Data were aggregated into 50 ms bins, transformed using an empirical-logit function, and fit using a model treating Syntactic Condition (Transitive vs. Intransitive) as a fixed effect. Syntactic Condition is a reliable predictor of looks to the causative scene in this time window, in analyses with Subject ($p < .05$) or Item ($p < .05$) as a random intercept.

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Conclusions

The current study builds upon previous work demonstrating that by age 2, toddlers can extract information about a new verb from its syntactic context, even before viewing a relevant event (Arunachalam & Waxman, 2010; Arunachalam et al., in press; Scott & Fisher, 2009; Yuan & Fisher, 2009).

These findings go further to demonstrate that they can do so in an impoverished social context. Like previous studies, toddlers were presented with the novel verbs in informative linguistic contexts, but here, we presented them without visual access to the speakers, child-directed speech, or discourse context.

This work is compatible with evidence of *noun* learning in contexts in which children have no interlocutor (e.g., Akhtar et al., 2001; Scofield et al., 2007), or no child-directed speech is available (Ma et al., 2011), further demonstrating that in the case of verb learning, rich linguistic information alone can be sufficient for acquiring at least some aspects of verb meaning.

Of course, in most real-world learning situations, at least some social context is available, and it is well established that toddlers make use of this information when it is available. However, our findings lend insight into how toddlers may acquire at least some aspects of verb meaning in overhearing contexts in which they may not be directly attending to the ambient speech, and in which no visual referent, discourse context, or child-directed conversation may be available.

This non-social presentation may be useful for children with Autism Spectrum Disorders, who have difficulty learning word meanings in social contexts (e.g., Baron-Cohen et al., 1997). We are currently pursuing this possibility.

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