



Contents lists available at ScienceDirect

# Journal of Experimental Child Psychology

journal homepage: [www.elsevier.com/locate/jecp](http://www.elsevier.com/locate/jecp)



## Co-viewing supports toddlers' word learning from contingent and noncontingent video



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### ARTICLE INFO

#### Article history:

Received 14 July 2017

Revised 2 September 2017

#### Keywords:

Word learning

Co-viewing

Contingency

Video chat

Pedagogical cues

Symbols

### ABSTRACT

Social cues are one way young children determine that a situation is pedagogical in nature—containing information to be learned and generalized. However, some social cues (e.g., contingent gaze and responsiveness) are missing from prerecorded video, a potential reason why toddlers' language learning from video can be inefficient compared with their learning directly from a person. This study explored two methods for supporting children's word learning from video by adding social-communicative cues. A sample of 88 30-month-olds began their participation with a video training phase. In one manipulation, an on-screen actress responded contingently to children through a live video feed (similar to Skype or FaceTime "video chat") or appeared in a prerecorded demonstration. In the other manipulation, parents either modeled responsiveness to the actress's on-screen bids for participation or sat out of their children's view. Children then viewed a labeling demonstration on video, and their knowledge of the label was tested with three-dimensional objects. Results indicated that both on-screen contingency and parent modeling increased children's engagement with the actress during training. However, only parent modeling increased children's subsequent word learning, perhaps by revealing the symbolic (representational) intentions underlying this video. This study highlights the importance of adult co-viewing in helping toddlers to interpret communicative cues from video.

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## Introduction

From infancy to adulthood, humans learn better when they believe that content is intentionally directed to them (Shafto & Goodman, 2008; Topál, Gergely, Miklósi, Erdohegyi, & Csibra, 2008). Across the preschool period, children use a growing range of behavioral and cognitive cues to determine a social partner's pedagogical intent, including pragmatic and semantic information during communication, as well as characteristics of the informant, such as the person's confidence in stating information (see Diesendruck & Markson, 2011, for a review). For very young learners, however, simple social cues presented during teaching are key. According to the "pedagogical stance" hypothesis (Csibra & Gergely, 2006; Gergely, Egyed, & Király, 2007), young children use social cues from adults as signals that content is being presented intentionally for them, shaping the way they attend to it and learn.

For example, during a toy play session, an adult offered infants a number of social cues—eye contact, gaze shifting, an engaging emotional expression, name referral, and talking in infant-directed speech about actions she wanted to demonstrate for them—or she offered comparable nonsocial actions. Then with only her arm visible, the adult showed how to use a hook to capture and pull a toy that was out of arm's reach. Infants previously exposed to the infant-directed social cues used the hook to grasp more out-of-reach toys than infants did who had experienced nonsocial actions (Sage & Baldwin, 2011). The social cues were given *prior* to the demonstration, setting up a pedagogical context for infants that carried forward; cues did not simply highlight action being simultaneously demonstrated but also signaled to children that information that followed was pedagogical in nature. Similarly, when an experimenter made eye contact and merely told 4-year-olds, "Look, watch this," children subsequently generalized the adult's actions more than if no prior pedagogical cues were offered (Butler & Markman, 2013).

In some situations, however, cues to pedagogy may necessarily be incomplete. As others have noted (O'Doherty et al., 2011; Richert, Robb, & Smith, 2011; Strouse, O'Doherty, & Troseth, 2013; Strouse & Troseth, 2014; Troseth, Strouse, Verdine, & Saylor, 2017), social cues from television are comparatively limited; the on-screen adult's gaze is not perfectly directed at viewing children, nor is it responsive to their gaze, verbalizations, or actions. A character on television does not use children's names, and bids to direct attention are not aligned with children's attention status. The absence of such cues may influence very young children to interpret prerecorded video formats as nonintentional situations (similar to the nonpedagogical comparison conditions used in research) and, thus, irrelevant for learning.

Indeed, video interventions designed to teach vocabulary have been largely unsuccessful (DeLoache et al., 2010; Krcmar, 2011; Robb, Richert, & Wartella, 2009; Vandewater, 2011). Toddlers can learn individual words from video when tasks are simple, such as when an object isolated in a close-up is repeatedly labeled in a voiceover (Golinkoff, Hirsh-Pasek, Cauley, & Gordon, 1987; Schafer & Plunkett, 1998; Scofield, Williams, & Behrend, 2007; Werker, Cohen, Lloyd, Casasola, & Stager, 1998), but they struggle with more challenging tasks requiring memory and the use of referential social cues (Strouse & Troseth, 2014; Troseth et al., 2017). The relative inefficiency of toddlers' language learning from video compared with face-to-face learning is especially striking (Krcmar, 2011; Krcmar, Grela, & Lin, 2007; Troseth et al., 2017).

Cues to pedagogy might be especially important for video-based learning because of young children's difficulty in understanding the symbolic (or representational) nature of two-dimensional screen images. In previous research, when toddlers were asked to apply information offered on video to a current real situation (e.g., imitation, object retrieval), they usually did not succeed (e.g., Barr, 2010; Barr & Hayne, 1999; Troseth, 2010; Troseth & DeLoache, 1998). For instance, after children watched as a person on the screen (whom they had met) hid a toy in a room where they had just played, they did not seem to realize that the on-screen event represented, and provided information about, the location of the hidden toy (Troseth & DeLoache, 1998).

Why do very young children lack "representational insight" (DeLoache, 1995) regarding this very iconic realistic type of image? One contributor may be the many ways in which video images can relate to reality (Troseth, 2010). Video can represent a real current event happening in the vicinity,

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