



Contents lists available at [ScienceDirect](#)

Cognitive Development



Supporting toddlers' transfer of word learning from video



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ARTICLE INFO

Keywords:

Transfer
Word learning
Video
Scaffolding
Parent-child co-viewing

ABSTRACT

Young children frequently do not transfer information from video to real-world situations. We provided perceptual and conceptual supports to help children transfer a new word from video to physical objects and photos. An on-screen actress labeled one of two novel objects; then 24-month-olds were asked to identify the 'modi.' Children failed to demonstrate word learning after holding the objects while viewing (*comparison condition*). In a *two-step transfer condition*, children correctly identified the modi on a test video image but did not identify the real matching object. However, when parents pointed out that the real objects were "the same" as those on screen (*scaffold condition*), children demonstrated reliable transfer of the word from video to reality. This study shows that parents' active co-viewing of videos supports transfer and suggests that toddlers' frequent failure to learn from video stems at least partially from their lack of understanding of the relevance of video to real life.

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The human ability to learn and transfer information across situations is flexible but selective. The ability to transfer depends on the flexible application of a stored mental representation to a new situation (Bransford, Brown, & Cocking, 2000; Hupp & Sloutsky, 2011). People may generalize knowledge to a new setting when some similarity to the learning situation allows them to access the stored memory (Barnett & Ceci, 2002; Barr, 2010; Herbert & Hayne, 2000; Hupp & Sloutsky, 2011).

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Differences between training and transfer situations may involve physical, temporal, and spatial context as well as modality of the information presented (e.g., visual vs. auditory) and knowledge domain (Barnett & Ceci, 2002). When these dimensions are closely matched across situations, transfer between them places fewer demands on memory and is considered “near.” For the youngest learners, however, memories are rigid and transfer initially is difficult. After very young infants learn to kick to make a mobile move (Borovsky & Rovée-Collier, 1990), press a lever to operate a toy train (Hartshorn et al., 1998) or assemble a toy, everything must match between the learning and test situations, or the infant will not retrieve and apply the memory (Hayne, Boniface, & Barr, 2000). With development, advances in representational flexibility allow transfer across increasingly divergent situations (see Hayne, 2004, for a review). Adults can transfer a problem solution they have used to a new problem when contextual differences are small or when supportive cues are given (Smith & Vela, 2001; Spencer & Weisberg, 1986); nevertheless, context-dependent memory (remembering better if the learning and retrieval situations match) also exists for adults (Smith & Vela, 2001).

Besides learning and generalizing from their own direct experience, people also make use of information offered in mediated form that they judge is reliable: someone tells them something, or they read it, see it in a photo or on television (DeLoache, 2000; Tomasello, 1999). Applying mediated information requires transfer from the form in which it was communicated to one’s own life. For instance, the application of information from a symbolic medium (such as picture or video image) to the real world involves transfer (Ganea, Ma, & DeLoache, 2011).

Given the challenge of transferring even knowledge acquired from direct experience to new situations, it should come as no surprise that very young learners often have difficulty applying symbol-mediated information. For instance, Zack, Barr, Gerhardstein, Dickerson, and Meltzoff (2009) taught 15-month-olds to push a button on a toy pictured on a touch screen to make a sound. When they saw the touch screen later, infants showed that they remembered the picture and the action that would make the sound (pushing the virtual button). However, transferring the information to a different context was difficult: When the infants were shown a matching 3-dimensional toy, they did not push its button to produce the sound.

The root of this transfer problem is not inability to match across dimensions. Infants, even newborns, perceive both similarities and differences between real objects and images of those objects (DeLoache, Strauss, & Maynard, 1979; Diener, Pierroutsakos, Troseth, & Roberts, 2008; Rose, 1977). Young infants respond to both videos of people and real people similarly, with smiles and excitement (Bigelow, 1996; Muir, Hains, Cao, & D’Entremont, 1996). Nine-month-olds attempt to pick up objects depicted in photos and video (DeLoache, Pierroutsakos, Uttal, Rosengren, & Gottleib, 1998; Pierroutsakos & Troseth, 2003) and produce similar emotional responses to objects and to video of those objects (Diener et al., 2008). Thus, infants appear to make sense of 2-dimensional images. However, research also indicates that very young children often fail to learn or appropriately transfer information from the screen to a real-world situation.

For instance, in a study of speech perception, 9-month-olds from English speaking families could differentiate Mandarin speech sounds at 10 months after repeatedly observing a Mandarin speaker face-to-face, but those who watched the same person on video showed no evidence of having been exposed to Mandarin (Kuhl, Tsao, & Liu, 2003). In several vocabulary studies, 12–18-month-olds failed to show vocabulary gains over a control group after 4–6 weeks of exposure to a popular baby video designed to teach vocabulary (DeLoache et al., 2010; Robb, Richert, & Wartella, 2009; Vandewater, 2011). In one study, an effect of the video finally became apparent 3 months later (Vandewater, 2011). Thus, watching infant videos was at best an inefficient way to learn language.

Less learning from video than from direct experience has also been found for other tasks. For instance, 12–30-month-olds imitated significantly fewer actions an adult on video had demonstrated on a novel object than did children who watched the adult in person (see Barr, 2010, for a review). Twenty-four-month-olds who watched a person on a TV screen hide a toy in an adjoining room usually did not find the toy, but they succeeded if they watched the hiding through a small window (Troseth & DeLoache, 1998). Children of this age remembered what they had seen directly but did not easily transfer what they had seen on video to a real situation.

One explanation for children’s failure to transfer involves perceptual differences between video and real objects. Two-dimensional video images provide less detailed visual information than real objects

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