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Cognitive Development



Learning words from pictures: 15- and 17-month-old infants appreciate the referential and symbolic links among words, pictures, and objects[☆]



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ABSTRACT

This experiment was designed to clarify the referential status of infants' newly learned words. We introduced 15- and 17-month-olds to a novel noun, presented in conjunction with pictures of two whisks that differed in color (one purple, one orange). We asked whether infants would extend this newly learned noun to other members of the same kind (other whisks), one differing only in color (a picture of a silver whisk) and another differing in both color and representational medium (a real three-dimensional silver whisk). Fifteen- and 17-month-olds' interpretation of the novel noun was not tethered tightly to the perceptual features with which the word had previously been paired. Instead, their interpretation was sufficiently abstract to include a new member of the same object category, although it differed in color and representational medium (a real silver whisk). Thus, by 15 months, infants appreciate the referential status of words and extend their meaning flexibly from pictures to objects.

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1. Introduction

As developmental psychologists, we strongly endorse reading books with infants not only for its benefits to the infant–caregiver bond, but also for the advantages book reading confers on infant language development – word learning in particular. Although research reveals that infants can map novel words to two-dimensional representations (presented in picture books or on screens), remarkably little is known about whether and how they link those words to the real, three-dimensional objects they may later encounter. This is an important question, because despite the consensus that infants are successful at word learning, the representational status of their early words remains a topic of spirited debate (Booth & Waxman, 2003, 2006; Ganea, Allen, Butler, Carey, & DeLoache, 2009; Gelman & Waxman, 2009; Graham, Booth, & Waxman, 2012; Plunkett, 1997; Sloutsky, 2009; Sloutsky, Lo, & Fisher, 2001; Smith, Jones, Yoshida, & Colunga, 2003; Smith & Samuelson, 2006; Waxman & Gelman, 2009). This debate engages a classic tension, ubiquitous throughout the psychological and developmental sciences, surrounding the fundamental content of human knowledge (in this case, the content of infants' word meanings) and the kinds of processes that underlie its acquisition.

The present experiment was designed to shed new light on the referential status of novel words that infants learn within the context of a picture book (e.g., “whisk,” applied exclusively to pictures). We ask whether, at 15–17 months, infants' interpretation of a newly learned word is sufficiently abstract to permit them to extend it to new exemplars from the same object category (e.g., other whisks) that differ in color and representational medium (real, three-dimensional whisks).

1.1. *Words as abstract and referential entities*

We begin with a brief overview of the two alternative frameworks for word learning. Within an associationist framework, early word meanings are built exclusively on sensory and perceptual contents bound together by association (Rakison & Lupyan, 2008; Sloutsky, 2009; Sloutsky et al., 2001; Smith et al., 2003; Smith & Samuelson, 2006). Proponents of this view argue that the nature of word meaning undergoes a developmental shift: Initially, word meanings incorporate perceptual content alone; only later do infants incorporate conceptual content into word meaning as well. Associationist accounts differ considerably in the age at which they locate this developmental shift – in some as early as age 2 (Samuelson & Smith, 1999) and in others as late as 8–11 (Sloutsky et al., 2001, p. 1707) – but all share the assumption that for infants and young children words are “. . . features of objects that contribute to their overall similarity, rather than symbols denoting category membership” (Sloutsky, Kloss, & Fisher, 2007, p. 180). Put differently, early in development, a word is nothing more than a feature of the perceptual and sensory experience(s) with which it has co-occurred, just as a black beret is a feature of the experience we associate with Jean Piaget.

We have argued for a different view, one based on fundamentally different assumptions about words, concepts, and development (see Waxman & Gelman, 2009 for extended discussion). On this view, early word meaning incorporates conceptual as well as sensory and perceptual content from the start, and in the process of establishing the meaning of a word, infants interpret this content within the context of their expectations about words, concepts, and reference (Baillargeon, 2008; Baldwin, 1995; Booth, Waxman, & Huang, 2005; Carey, 2009; Gelman & Waxman, 2009; Gelman & Williams, 1998; Putnam, 1973; Spelke, 2000; Xu, Cote, & Baker, 2005). In essence, development is characterized by continuities rather than developmental shifts. Considerable evidence is consistent with this continuity view. From infancy, words (and the concepts to which they refer) are more than collections of sensory and/or perceptual features, bound together by purely associative processes. By roughly their first birthdays, infants extend novel nouns in a principled fashion, extending them specifically to object categories and not to other similarity-based groupings (Booth et al., 2005; Waxman, 1999), and using them to support inferences about new objects (Graham et al., 2012; Graham, Kilbreath, & Welder, 2004; Keates & Graham, 2008; Xu et al., 2005). Results like these indicate that infants appreciate that a word is a symbol whose referential scope extends beyond the particular object with which it has been paired.

The distinction between the two frameworks was illuminated in an experimental paradigm introduced by Preissler and Carey (2004). An experimenter introduced 18- and 24-month-olds to

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