



Preschoolers' interpretations of gesture: Label or action associate?

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ABSTRACT

This study explores a common assumption made in the cognitive development literature that children will treat gestures as labels for objects. Without doubt, researchers in these experiments intend to use gestures symbolically as labels. The present studies examine whether children interpret these gestures as labels. In Study 1 two-, three-, and four-year olds tested in a training paradigm learned gesture–object pairs for both iconic and arbitrary gestures. Iconic gestures became more accurate with age, while arbitrary gestures did not. Study 2 tested the willingness of children aged 40–60 months to fast map novel nouns, iconic gestures and arbitrary gestures to novel objects. Children used fast mapping to choose objects for novel nouns, but treated gesture as an action associate, looking for an object that could perform the action depicted by the gesture. They were successful with iconic gestures but chose objects randomly for arbitrary gestures and did not fast map. Study 3 tested whether this effect was a result of the framing of the request and found that results did not change regardless of whether the request was framed with a deictic phrase (“this one (gesture)”) or an article (“a (gesture)”). Implications for preschool children's understanding of iconicity, and for their default interpretations of gesture are discussed.

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1. Introduction

Adults use gestures as labels for objects in experimental situations with young children (e.g., Goodwyn & Acredolo, 1993; Graham & Kilbreath, 2007; Namy, Campbell, & Tomasello, 2004; Namy & Waxman, 1998; Striano, Rochat, & Legerstee, 2003). It is an open question whether children in these situations interpret gestures as labels. This article reports on three studies designed to test this assumption through an examination of children's comprehension of arbitrary gestures. The fundamental question addressed by this article is whether or not hearing preschool-aged children treat gestures as labels for objects. This study augments research demonstrating the ability of preschool children to understand iconicity (e.g., Goodrich & Hudson Kam, 2009; Tolar, Lederberg, Gokhale, & Tomasello, 2008)

through its analysis of children's interpretation of the communicative function of gestures used in a symbolic manner.

This paper addresses the way in which children who are not exposed to systematic gesture input, interpret gestures used with symbolic intention in experimental settings. The assumption made by researchers is that children will treat them as interchangeable with spoken word labels, that is, like nouns. To be clear, this paper does not examine children's interpretation of naturally occurring co-speech gesture, nor does it examine children's interpretation of gesture used as part of a system, such as with sign languages. As its name implies, co-speech gesture occurs in conjunction with a verbal utterance. In this situation, gesture is not required to carry the full burden of communication (McNeill, 1992). Children's linguistic and cognitive development has nevertheless been shown to benefit from exposure to co-speech gesture (e.g., Capone & MacGregor, 2005; Goodrich & Hudson Kam, 2009; McNeil, Alibali, &

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Evans, 2000; Ping & Goldin-Meadow, 2008). Children's acquisition of sign languages is also well studied and documented (see Schick, Marschark, & Spencer, 2006) as is the role of iconicity in its acquisition (for a review, see Schick, 2006). Unlike these two areas of research, this paper will focus on experimental situations, in which children who are typically only exposed to co-speech gesture are briefly exposed to gestures used by researchers as symbolic labels for objects. This is a very particular use of gesture, but conclusions based on this type of research influence our understanding of children's mastery of iconicity and symbolic reference.

Children accept both verbal and manual labels in the first months of language acquisition (Iverson, Capirci, & Caselli, 1994). If anything, they produce more gestural indicators in the early period and, as they master the complexities of reference, they shift to a preference for the spoken word (Goodwyn & Acredolo, 1993; Guidetti, 2005). This preference for gesture in the early phases of symbolic acquisition was predicted by Werner and Kaplan (1963) and has been supported by a wide variety of work (Bates et al., 1979; Özçalışkan & Goldin-Meadow, 2005).

Werner and Kaplan (1963) claimed that children would find the arbitrary nature of symbolic reference difficult and hence, would rely on a relatively easier path into abstract reference through "natural symbols" – namely the use of gesture and deictic words. This "natural reference" was thought to provide a stepping-stone into arbitrary or conventional reference. That is, the child would connect the object to the gesture through the many evident points of perceptual similarity, a finding supported by the work of Iverson et al. (1994) who found that gestural representation decreased markedly between 16 and 20 months of age.

Recent research on young children's willingness to use gesture as a label for an object has refined these ideas, particularly with respect to children's comprehension of gesture. Namy and Waxman (1998) found that children aged 18 months were equally likely to learn a verbal label or an arbitrary gestural label as a superordinate category name, picking out other objects as exemplars of a labeled category. In contrast, children aged 26 months were only willing to extend a verbal label in this manner unless they were given additional opportunity to produce the arbitrary gesture labels. Namy and Waxman conclude that at this age, children's attention was focused on speech and its referential properties. Striano et al. (2003) found that children aged 26 months learned iconic gestures as labels, using a different method. Namy et al. (2004) directly tested these previous results by comparing a child's ability or willingness to learn iconic vs. arbitrary gestures as labels for objects. Werner and Kaplan (1963) and others claim that a resemblance between the gesture and the object should facilitate the child's acquisition of a label. Namy et al. (2004) challenged this, examining many reasons why iconicity may not provide children with easier access to the referential act. The most significant of these reasons is that young children may simply fail to attend to the perceptual similarity between gesture and object (a point argued early on by Bates et al. (1979)).

Namy et al. (2004) found that children aged 18 months used either iconic or arbitrary gestures to label objects, but that at age 26 months children only used iconic gestures. By age 4 years children again accepted either iconic or arbitrary gesture. This finding of a U-shaped curve supported Namy and Waxman's earlier claim that age 26 months is a particularly conservative period, a result supported by other research (e.g., Graham & Kilbreath, 2007). In preschool children then, the data from Namy et al. (2004) suggest that the ability to use iconic gestures as labels is stable, but the ability to use arbitrary gestures dips at age 26 months. At this age, labels should be verbal, but if they are manual, they must be iconic. The iconicity of gestural labels enables the child to override his or her modality-specific focus for referential acts. This conclusion is supported by Namy (2008), which demonstrated that children show consistent evidence of attending to the iconic properties of gesture starting at 26 months of age but not before.

This article presents three studies designed to test the assumption in the literature that children treat gestures as labels for objects. Study 1 extends the results of Namy et al. (2004) with a focus on the comprehension of arbitrary gestures by children between 2- and 4-years of age. Studies 2 and 3 then use a fast-mapping procedure to test directly whether children are treating gestures (both iconic and arbitrary) as labels or alternatively, as descriptions of the actions one can perform with an object, that is, as action associates (*cf.* Tomasello, Striano, & Rochat, 1999).

2. Study 1

Namy et al. (2004) focused on the very early period of language development, in particular 18- and 26-month-olds, and applied the same methodology to all participants, including the 4-year-olds. Each child was taught two gestures in a between subject design, either both iconic or both arbitrary. The child was then asked to match each gesture by making a choice between two objects as a demonstration of learning. It is possible that their results show a ceiling effect for older children since participants were required to learn two gesture-object pairs and keep track of two distractors, regardless of age. This leaves open the question of whether older children would make a distinction between iconic and arbitrary gestures if they were presented with a more demanding task. There is little other research on how older preschool aged children interpret gesture.

We tested whether 2-, 3- and 4-year-olds would be equally likely to learn a gestural label for an object. Based on how children treat spoken language labels, we identified two predictions regarding how preschool children might use gestures if they treat them as labels: (a) children should not distinguish between iconic and arbitrary forms, and (b) children should apply the mutual exclusivity constraint to gestural labels.

Although iconicity is far more readily observed in a manual rather than an oral modality (Taub, 2001), it is unlikely that this should influence children's early use of gestural forms. Given exposure to systematic input, young

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