



Common ground on object use associates with caregivers' gesturese



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ABSTRACT

Caregivers modify their communication when interacting with infants, and these modifications have been related to children's language development. However, the factors influencing caregivers' modification of gestures are understudied. This study examined whether infants' object knowledge, considered as common ground shared with the caregiver, relates to caregivers' gesturese. Six caregiver-infant dyads were videotaped every two months for 15 min in their homes, from child age 8-to-16 months, while they played with two separate objects (i.e. toys). Results indicated that the changes in infants' object knowledge were paralleled by associated changes in caregivers' gestures: parents increased both the amount and the complexity of their gestures.

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1. Introduction

When caregivers communicate with infants in an intentional, goal-directed way, they produce communicative acts that typically focus on objects from the immediate environment. Previous literature shows that the first gestures caregivers address to infants are typically deictic gestures referring to physical objects (e.g., pointing to an object; Butterworth & Grover, 1988; Iverson, Capirci, Longobardi, & Caselli, 1999; Murphy & Messer, 1977). This implies that the first intentional communicative acts that infants understand involve concrete referents, such as objects. This makes the knowledge of objects an essential component of early communicative interaction. The aim of the current study is to explore the associations between infants' knowledge of objects and the gestures of caregivers.

1.1. Common ground

From a pragmatic perspective, communicative understanding requires that both partners mutually share knowledge about the communicative referent (and they know that they do so; Tomasello, 2008). For example, if an infant holds out a closed bottle to a caregiver after an attempt to open it, the caregiver understands the meaning of the infant's gesture relying on some previously established knowledge that they share about this bottle.

Such knowledge and meaning that we share with our communicative partners is referred to in the literature as 'common ground' (Clark, 1996; Lee, 2001; Schiffer, 1972; Tomasello, 2003). Common ground is important because it allows partners

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to anchor their communicative acts into a pool of shared knowledge and meaning, which enables them to access each other's intentions, and to communicate successfully. Thus, adjusting to the shared common ground is essential for mutual understanding.

While it is true that common ground is continuously established throughout the lifespan, important experiences and knowledge are shared during infancy and childhood, especially in interactions between infants and caregivers with objects. Because they are finely tuned to infants' current state, caregivers support infants' interactive efforts (i.e. scaffolding, Bruner, 1975) allowing them to move to the next developmental level (i.e. zone of proximal development, Vygotsky, 1934/1986).

Bruner has described a particularly relevant way in which infants learn from caregivers. He claimed that within structured, frequent, and repetitive interactions called 'formats' such as peek-a-boo, getting dressed or book reading, the caregiver transmits different meanings and thus establishes with the young child various types of common ground (Ratner & Bruner, 1977). For example, in line with Bruner's socio-interactive approach, Moro and Rodríguez (2005) described how within structured play interactions with toys caregivers transmit knowledge related to the conventional use of those toys and how infants progressively appropriate it.

The importance of shared common ground has been mainly studied in verbal communication, typically between adults (e.g., Sperber & Wilson, 1986) leaving relatively unexplored its role in the development of communication in children. Several recent studies have examined how a type of common ground – perceptual common ground – influences infants' production (Bourdais, Danis, Bacle, Santolini, & Tijus, 2013; Liebal, Carpenter, & Tomasello, 2010) and understanding of communicative gestures (Ganea & Saylor, 2007; Liebal, Behne, Carpenter, & Tomasello, 2009; Moll, Richter, Carpenter, & Tomasello, 2008; Tomasello & Haberl, 2003). For example, Ganea and Saylor (2007) found that 14-month old infants rely on previously shared visual experience with an adult in order to disambiguate adult's gestures and respond appropriately to them. However, it remains unclear how common ground shared between the infant and the caregiver relates to the adjustments caregivers perform when communicating with infants.

1.2. *Gestures*

We know from previous work that when addressing infants and young children, caregivers modify not only their speech (i.e. motherese, also called infant-directed speech or baby talk; see Snow, 1995 for a review), but also their gestures (i.e. gesturese, also called infant-directed gestures or gestural motherese), and their actions (i.e. motionese, also called infant-directed actions or actionese). It has been found that, compared to gestures directed to adults, caregivers gesture less frequently and use conceptually simpler gestures such as pointing indicating concrete referents when addressing infants and young children (Bekken, 1989; Iverson et al., 1999; O'Neill, Bard, Linnell, & Fluck, 2005). Additionally, it has been reported that compared to adult–adult interactions in which gesture generally complements or supplements information conveyed in speech (McNeill, 1992), the large majority of caregivers gestures function to reinforce the message conveyed in speech (Iverson et al., 1999; Özçalışkan & Goldin-Meadow, 2005). These gestural modifications facilitate young children's communicative understanding. Importantly, simplification of actions has been related to cognitive gains such as infants' enhanced attention to caregivers' object-related actions (Brand, Baldwin, & Ashburn, 2002) and infants' object exploration (Koterba & Iverson, 2009).

So far, studies on gesturese and motionese provide evidence about the characteristics of such modifications as well as the benefits of these modifications for the infant. However, much less is known about the factors that influence gesturese. When communicating with infants through gestures, caregivers refer primarily to objects. Thus, the knowledge that the infant and the caregiver share about the referent might influence caregiver's modification of their gestures.

A major cognitive development in the first two years of life is the knowledge that infants gain about objects (e.g., Piaget, 1952), including the progressive mastery of objects' use (Moro & Rodríguez, 2005). Because the way objects should be used is determined by a culturally shared convention, infants' mastery of object use represents a type of knowledge about the object that is mutually shared with the caregiver.

In this study we argue that the knowledge about objects' conventional use shared between infants and caregivers represents a type of common ground. We already know that shared knowledge about object use influences the way caregivers instruct their children how to use objects (Moro & Rodríguez, 2005). However it remains unknown whether shared common ground has an effect on the adjustment of caregivers' communicative gestures. If the infant's knowledge of objects' conventional use is an integral part of early communicative dynamics, then we would predict parallel and closely associated changes in infants' knowledge of objects and caregivers' gestural input. On the other hand, if infants' object knowledge has no bearing on the communicative interaction, then we would predict no such association between infants' object knowledge and caregivers' gesture input.

To explore these possibilities, we videotaped five interaction sessions from six caregiver–infant dyads in their homes every two months between child age 8–16 months. Interactions involved two separate toys (a doll with a dinner set, a shape-sorter box) provided by the experimenter, making sessions more comparable across dyads and ages. We coded each video for (1) infants' knowledge of objects assessed by the time spent using objects either in a non-conventional way (e.g., placing a shape block in mouth) or in a conventional way (e.g., placing a block in a shape-sorter box), and for (2) caregivers' gesture input to their infants examined through levels of *gesture support*. *Highly supportive* gestures were typically repetitive and conveyed the same information as the accompanying speech, while *minimally supportive* gestures by caregivers varied in form and function and often conveyed information not found in speech.

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