Infant Behavior & Development 36 (2013) 94–101

Contents lists available at SciVerse ScienceDirect

Infant Behavior and Development

Do 10- and 13-month-old infants provide informative gestures for their mothers in a hiding game?

Cécile Bourdais[a,*], Agnès Danis[a], Camille Bacle[c], Arnaud Santolini[b], Charles Tijus[a]

[a] Laboratoire "Cognitions Humaine et Artificielle" CHArt, Université Paris 8, 2 rue de la Liberté, 93526 Saint-Denis cedex02, France
[b] Université François Rabelais de Tours (IUT, Département Carrières Sociales), France
[c] Université Paris 8, UFR de Psychologie, 2 rue de la Liberté, 93526 Saint-Denis cedex02, France

ARTICLE INFO

Article history:
Received 7 May 2012
Received in revised form 18 October 2012
Accepted 26 November 2012

Keywords:
Referential communication
Ostensive gazing
Pointing
Mother–infant interaction
Mind knowledge
Routines

ABSTRACT

Infants' abilities to request and to inform by gazing and pointing at 10 months and 13 months of age are studied. We expect that 10-month-old children may use more gazing than pointing and that 13-month-old children perform more pointing than gazing. We hypothesize further that10-month-olds and 13-month-olds perform imperative pointing similarly, they differ when informative pointing is requested: younger infants would fail to use it. The experimental setting tests acts of indicating in a hiding game during routine and de-routinized situation by unbalancing the accessibility of information available to mother. In routines, where the mother is present during hiding, 10-month-old have a high score of correct indications by gaze as well as by pointing. In a non-routine context, 10-month-old children fail to indicate by gazing and pointing whereas 13-month-old children succeed. Results are discussed in terms of infants' Theory of mind, more specifically the ability to represent one's partner epistemic intentions.

1. Introduction

We study here the emergence of informative behavior in children between 10 and 13 months during mother–infant interaction. From 10 months on, children master the request of an object; they have to learn how to inform a partner. According to Halliday (1975) (see Franco & Butterworth, 1996) "Babies in the second year of life would move from a "pragmatic" (e.g., personal, regulatory, etc.) and toward a "mathetic" function of communication, eventually leading to intrinsically linguistic forms such as information exchange". Informative pointing, a precursor of language, is an intentional communicative act which aims at expressing something new to someone. Consequently, informative pointing implies that the child understands that others may be knowledgeable or ignorant of an event (Tomasello, Carpenter, & Liszkowski, 2007). Social cognition is based on the matching of self and others' experience, "A central question regarding early social cognition is how do infants start to relate their own private experience to the private experience of others" (Rochat & Striano, 1999) and so are able to regulate their communication.

One theoretical perspective in the study of communication is to analyze the development of intentional communication as linked to the understanding of mind knowledge (Camaioni, 1992, 1993; Reddy, 2001). This has been established from naturalistic observations and questionnaire to parents. Reddy (2001) described steps in understanding and directing adult's intention and attention in the course of the first year. Camaioni (1992, 1993) found that it is only around 10–11 months of age that infants can point to request (or "protoimperative" pointing) in order to ask the adult to find an object for them, as well

* Corresponding author.
E-mail address: cecilebourdaisP8@gmail.com (C. Bourdais).

0163-6383/$ – see front matter © 2012 Elsevier Inc. All rights reserved.
http://dx.doi.org/10.1016/j.infbeh.2012.11.006

as declarative pointing about two months later (12–13 months of age) in order to show the adult an external target to share an internal state (Camaioni, 1992, 1993). Camaioni suggests that with imperative pointing, the child's goal is to influence someone's behavior meanwhile with declarative pointing, the goal is to influence someone's mental state. For Camaioni, this difference is crucial as only declarative pointing is an act of intentional communication, as it implies that others have mental states such as being interested in something.

A sub-type of declarative pointing was recently evidenced by Liszkowski, Carpenter, Striano, and Tomasello (2006) and Liszkowski, Carpenter, and Tomasello (2008). These authors have shown that 12-month-old children are able to produce informative pointing: indeed, they are able to help an ignorant person to find the location of the object he (or she) is looking for, which can be considered as a "pointing for you" ability. In the present work, we examine if before 12 months children have the ability to represent the partner's epistemic state and whether they are subsequently able to inform him about an individual experience.

Recent theoretical accounts of human communication have emphasized the importance of joint attention, shared experience and common ground for the child's understanding of communicative intentions of adults and therefore the importance of motivation for children to point communicatively. Bruner claims that very young humans appear to be motivated to share their focus of attention with the other (eye-to-eye routine or "discovery routine") (Bruner, 1975, p. 269). Once eye-to-eye contact is established, the integration of an object as an object of attention appears in the first months during free play interactions (Bruner, 1999). Joint attention or "meeting of minds" observed at 6 months includes looking back and forth between the object and the partner, each looking at the other's face when indicating by looking, pointing and verbalizing (Bruner, 1995). Indication is either initiated by mother or child. The indicating mode is primarily based on shared knowledge of the course of these actions or routines. Such formats or routines are parts of construing signifying acts and later utterances. Tomasello agrees with this theoretical point of view: for him, joint attention promotes the production of declarative pointing. Indeed, during joint engagement, the child's actions are tied to those of their partner, in cooperative actions. By looking and touching objects together, both share the aim of their actions. "In joint engagement, infant and adult form a shared goal together and thereby act in a "we" mode (. . .) Infants find it easier to determine what "you" know than what "he" or "she" knows because the other's actions and experiences are directly tied to their own" (Moll, Carpenter, & Tomasello, 2007, p. 834).

A number of empirical studies performed by Tomasello et al. (2007) confronted the child with various experimental tasks with an experimenter. They showed that understanding and directing other attention and understanding and directing other knowledge develop simultaneously around 12 months of age. Liszkowski, Carpenter, Henning, Striano, and Tomasello (2004) showed that 12-month-old infants can use pointing to draw the other's attention on a referent object, and that children wish to share the attention and interests of the adult. Children produce at least one pointing per trial even if the adult is already looking at the object. In the joint attention situation, the number of points per trial is lower than in other situations but the average duration of a pointing is higher. Moreover, Liszkowski, Carpenter, and Tomasello (2007) have shown that 12- to 13-month-old children are able to draw the adults' attention on a new referent. They understand what is new for their partner and what is not, what is of interest and what is less. Last, this study shows that at that age, infants can communicate about an absent referent and consider the emotional attitude of the adult during joint engagement.

Considering infants' understanding of adults' state of knowledge, Moll and Tomasello (2007) evidenced that 12-month-old children show the ability to know what others know, according to what they have or have not experienced in the immediate past. Further, Tomasello and Haberl (2003) found that 12-month-old children differentiate objects that have been shared in joint actions from those that were not shared, and offer the adult, when he returns, the object they suppose the adult wants: the novel object. These authors support the idea that joint engagement in itself (passive engagement) – in the absence of actually manipulating and exchanging the object of joint attention – is sufficient for infants to attend to and know what the other has experienced (Moll et al., 2007). Indeed, Liszkowski et al. (2006) have shown that 12- and 18-month-old children are able to inform an adult who ignores the location of an object he previously used on his own (passive trial) or that they have manipulated together (active trial). Children then have spontaneous repeated pointing toward the object location. Thus, as early as 12 months of age, infants would be able to provide indications to the partner with a pro-social motive. Liszkowski et al. (2008) demonstrated that 12-month-old children may understand the adult is ignorant versus knowledgeable of the location of an object depending on whether he has seen or not seen the event. Authors stress that the function of informative pointing may be to change the adult's mental state.

We analyze here the emergence of informative pointing in a naturalistic context inspired by Bruner's theoretical work. Bruner studied the development of acts of indicating inside and outside routines (interactions between the child and his/her mother), considering independently the ontogenesis of request (Bruner, 1983) and the growth of reference (Bruner, 1975, 1983). He showed the caregiver's crucial role in the development of both socio-cognitive skills: through interaction the infant internalizes those skills (Vygotsky, 1978). Adults become the mediator between children and objects, thus allowing the infants to integrate the praxic and communicative operating modes into their behavior (1983). These objects will later become ideic and verbal referents (Bruner, 1975). Therefore we used an instrumental context including the mother, and in which reference may be included. "While requesting an object, the main task is to introduce the reference within the request" (Bruner, 1983, p. 107). Thus, in the context of request, we could manipulate the access of the reference for the partner and oppose a knowledgeable referential object's location versus a non-knowledgeable one. We designed then two contrasting sessions of hiding games during mother–infant interactions, interacting in their usual way.