

Infant Pointing: Communication to Cooperate or Communication to Learn?

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Tomasello, Carpenter, and Liszkowski (2007) present compelling data to support the view that infant pointing, from the outset, is communicative and deployed in many of the same situations in which adults would ordinarily point for one another, either to share their interest in something, or to informatively help the other person. This commentary concurs with the view that infant pointing is a communicative gesture, but challenges their interpretation of the motives behind pointing in 12-month-olds. An alternative account is proposed, according to which infant pointing is neither declarative nor imperative, but *interrogative*, and rather than being driven by the motive to share or help, it may serve a powerful cultural learning mechanism by which infants can obtain information from knowledgeable adults.

Classically, infant pointing has been described as either imperative or declarative (Bates, Camaioni, & Volterra, 1975). Imperative pointing is characterized as a largely selfish means by which infants can obtain objects they want by exploiting others as “social tools.” This type of pointing is generally viewed as not requiring any mental state attribution by the infant and may, initially at least, be a noncommunicative act (Shatz, 1983). Conversely, declarative pointing is usually considered to be a qualitatively different behavior, grounded in an understanding of its communicative function, and entailing an understanding of others as mental agents whose mental states can be influenced through the pointing behavior. We think that this classic view of infant pointing may have created a false dichotomy, in which the possible evaluation of attentional and mental states in the deployment of imperative pointing has been overlooked, and the prosocial motive behind so-called declarative pointing has been overattributed (Gómez, Sarria, & Tamarit, 1993).

In their review article, Tomasello, Carpenter, and Liszkowski (2007) uphold the classic dichotomy between imperative and declarative pointing, and argue for a “rich” interpretation of infant pointing that attributes to 12-month-old infants not only an understanding of others as mental agents but also a sophisticated use of referential communication and highly social and uniquely human motives. There is

a sense in which this claim is easy to accept, especially in light of recent findings that infants around this age already appear to understand when others are sometimes ignorant (e.g., Surian, Caldi, & Sperber, in press) and are able to make impressive inferences based on people pointing to them (Behne, Carpenter, & Tomasello, 2005), which clearly requires that they make use of the same principles of human communication as do adults (Sperber & Wilson, 1986).

In this commentary, we critically examine the evidence put forward for this rich interpretation of infant pointing and suggest that Tomasello and colleagues may be too quick to assign prosocial cooperative motivations to preverbal infants. We offer an alternative explanation for the evidence on infant pointing that, we think, warrants consideration and experimental investigation. We propose that each of the instances of infant pointing may in fact have a more selfish motive. We argue that pointing in infancy may be broadly “interrogative” or information requestive in nature, and represents attempts to get the adult to “do” something *for* the infant, rather than attempts to cause the adult to “know” something or “share interest about” something. Such “interrogative” pointing, if it exists, may function as a powerful tool for cultural learning.

In their review, Tomasello et al. argue for the truly communicative nature of infant pointing by attempting to show that it involves the three main aspects of human communication: reference, social intent or motives (illocution), and communicative intent. We examine these claims in turn.

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Reference

The studies reviewed by Tomasello et al. provide convincing evidence that infants' pointing behavior is a referential act. Contrary to Moore and D'Entremont's (2001) claim, infants do not seem to be satisfied by the adult's response to their pointing action unless she attends specifically to the designated object or event (Liszkowski, Carpenter, Henning, Striano, & Tomasello, 2004). In addition, if the adult seemingly misinterprets the pointing act and attends to a different object, infants try to repair the failed communication by repeatedly indicating the referred object or event (Liszkowski, Carpenter, & Tomasello, 2007b).

We are less convinced by the claim that pointing is also deployed to refer to absent objects or events by infants (Liszkowski, Carpenter, & Tomasello, 2007a). Pointing is an inappropriate tool to designate absent referents, as it is referential only through indicating a particular location. Pointing to an empty location could only in exceptional circumstances refer to an object that used to be there, but pointing to an invisible object, located behind a screen, in a cupboard, or in a container, is a natural everyday gesture. When, in the study by Liszkowski et al. (2007a), infants pointed to the window where the interesting object had just disappeared, we propose that they referred not to an *absent* but to an *occluded* object. It would not be difficult to test which of these interpretations is correct. Where would infants point if the puppet, unseen by the adult, appeared from, and then disappeared, behind a barrier? If they point to an absent referent, they should indicate the location where the puppet entertained them. If, however, as we predict, infants indicate the likely location of the occluded puppet, they should point to the barrier. Infants can understand that a pointing gesture may refer to hidden objects (Behne et al., 2005), and the results of Liszkowski et al. (2007a) suggest that they can also produce such a signal.

Although it may not amount to evidence for absent reference, it is the pointing to an occluded object that provides the best evidence for the referential nature of infants' pointing. Such a gesture is not directly driven by what infants see (the current visual input), and cannot simply function to get the adult's visual attention to the indicated object. Rather, pointing in this situation specifies the invisible object only in a communicative-referential sense, and only with the implicit assumption that the intended recipient (the adult) will be able to disambiguate it.

Motives

As Tomasello et al. point out, a pointing gesture, even if it is a referential act, does not represent a

communicative act unless the social intention (the "illocution") is recoverable from it. In adult communication, such motives are usually expressed by accompanying verbal or nonverbal communication. It is thus slightly surprising that none of the recent studies on pointing from the Tomasello group reports the expressive behavior of the infants during and after pointing. Instead, they attempt to uncover the motives behind infant pointing by examining the conditions under which this behavior occurs and the responses that infants expect. Tomasello et al. propose that two kinds of cooperative motives drive those instances of infant pointing that cannot be classified as proto-imperatives (because the infants are not interested in obtaining the indicated objects): helping and sharing. The motivation to help would induce infants to inform ignorant people, while the motivation to share would make them express their interest in objects and events.

Do Infants Point to Inform Others?

Infants point to a location where a target (defined by the previous activity of the experimenter) has been displaced when the experimenter has not seen it (Liszkowski, Carpenter, Striano, & Tomasello, 2006) and even point to the location where an event previously occurred when the experimenter was not looking in that direction (Liszkowski et al., 2007a). As the infant in these studies showed no signs of actually wanting the object for themselves, the authors conclude that the infant's motive was to altruistically inform the experimenter of the object's location because they understood that she wanted to find it (Liszkowski et al., 2006).

Some aspects of these results suggest that infants do take into account both the epistemic (i.e., the absence of knowledge about an object's location) and the volitional states (i.e., her current goal) of the experimenter when deciding when and what to point to. Nevertheless, we are not convinced that infants point in these situations from purely altruistic motives. If the recognition of these mental states, together with the altruistic urge to help others, were sufficient to elicit pointing, we would observe infants pointing whenever they understand adults' ignorance or false beliefs about displaced objects. However, in a recent study (Onishi & Baillargeon, 2005) that demonstrated such abilities, pointing behavior was hardly ever observed (R. Baillargeon, personal communication, November 2006). The crucial difference between this study and the ones in which

Liszkowski, Carpenter, and Striano et al. (2006) and Liszkowski et al. (2006a, submitted) successfully elicited “informative” pointing is that the latter ones established a clear communicative setting between the child and the experimenter. But why should the communicative nature of the situation be important if infants are altruistically pointing to inform an ignorant adult?

We propose that an alternative way of viewing the infants’ behavior in these experiments, one in which it would be important for a communicative context to be established, is that infants wanted the experimenter either to perform the same action again (Liszkowski et al., 2006) or to make the same thing happen again (Liszkowski et al., 2006a). If infant pointing in these studies reflects such a request, it may be important that the infant regards the experimenter as a willing participant, something which prior infant-directed communication may establish. Tomasello et al. discount this possibility because, they claim, the effects, not the experimenter’s action, would not be very interesting to the infant in the first study, and therefore it is unlikely that infants would be requesting to see them repeated. However, it may be exactly these kinds of opaque and novel actions with no obviously interesting outcome that infants need to culturally learn about and therefore should seek to understand, especially in cases (such as in this study) where the adult appeared to be ostensibly demonstrating the action “for” the infant (Gergely & Csibra, 2005).

In the other study (Liszkowski et al., 2007a), infants pointed toward a location where an event previously occurred both when the experimenter did not see the event (she was oriented the opposite way) and when she did. The authors interpret this behavior in one case (experimenter did not see) as “informative pointing” and in the other case (experimenter did see) as “expressive pointing.” The design of the study, however, makes an alternative explanation possible. According to Liszkowski et al. (2007a), “On each trial E turned to one side and looked at one of the two windows. At that same moment, E2 protruded a puppet through one of the windows” (p. F3), creating a clear contingency between the experimenter’s turning (either toward or away) and the puppet’s appearance. Thus, infants in this context were likely to have inferred that the experimenter somehow caused the effect to happen. By pointing during the “referent absent” phase toward the occluded puppet, infants, referring to the now-occluded puppet, may have been saying to the experimenter, “make it happen again.” In both cases, therefore, infants’ “informative” pointing could be

seen as a requestive action: The infant requests that the experimenter reproduce a novel and informative action. Note that this requestive communication is not like the classical proto-imperative gesture: The infant does not request a reward—she requests a demonstration. Thus, while we agree that pointing in these contexts is undoubtedly communicative, and may indeed require the infant to evaluate the epistemic states of the experimenter, we think that such pointing may not be altruistic, but rather more self-serving.

Do Infants Point to Share Interest?

Perhaps one of the most puzzling examples of infant pointing is the tendency to point toward things that others are already attending to (Moore & D’Entremont, 2001), because this kind of pointing cannot be an attempt to direct the other person’s attention to something. An alternative motive, argue Tomasello and colleagues, is that by pointing toward objects that the adult already attends to, infants are registering their interest, excitement, or attitude about the object for the adult—and perhaps even trying to get the adult to align with their emotions. Assuming that this kind of sharing and emotional alignment serves some function for the infant’s social development, if true, this motive for pointing would be deeply social. However, we offer an alternative explanation for this kind of pointing according to which pointing to objects that the adult already attends to may again reflect the “selfish” motive of obtaining information (a label, valence information, etc.) about the referent. This proposal is similar to the one offered by Gómez et al. (1993), who suggest that infants’ “declarative” points attempt to elicit an emotional or attentional reaction from the adult, not to the infants themselves (as Moore and D’Entremont proposed), but *about* the referent, presumably so as to obtain some information about it.

Liszkowski et al. (2007a) discount this motive because in their study, when the experimenter behaved in a neutral, uninterested way, the infants tended to point less across subsequent trials. If infants simply pointed to request information about the referent, they argue, they should point across trials regardless of whether or not they receive a positive reaction from the experimenter. We agree with their reasoning that this hypothesis would predict that infants should be satisfied not only with a positive but also with other kinds of responses. However, it is also possible that infants interpreted the experimenter’s behavior in the “uninterested” condition as uninterested *in the infant* or generally

uncooperative (refusing to provide information), which reduced their inclination to continue to request information from that person. This interpretation of the results is supported by the fact that, unlike when they received a positive response, infants did not try to repair the communication when the adult apparently misunderstood the referent and responded uninterestedly (“no sharing” condition). Had they tried to share their interest in a specific event, they should have attempted to correct the misunderstanding by pointing again to the intended referent. They did not do so probably because they interpreted the adult’s response as a refusal to respond to their request for information.

Infants Point to Obtain Information

We have proposed that both types of “declarative” pointing, described by Tomasello et al., are in fact requestive acts of a specific kind. According to this account, infants point to specify a referent about which they wish to obtain information. In this respect, infant pointing is neither proto-imperative nor proto-declarative, but *proto-interrogative* in nature, and functions to induce the manifestation of some knowledge from the willing adult (cf. Csibra & Gergely, 2006). This knowledge can be one of several kinds: a demonstration of how to handle a novel object or how to bring about an event, or revealing some hidden properties, valence, or label of a novel object. Perhaps it is not a coincidence that the new and unfamiliar events used by Liszkowski and colleagues provide the best trigger for eliciting pointing in infants. The adult’s willingness, evidenced by his/her earlier communication toward the infant, also seems to be an important factor (infants do not point to inform an ignorant adult who has not previously engaged the infant in a communicative exchange).

This account of early infant pointing incorporates many of the intuitions that are embedded in the “lean” and “rich” interpretations of this behavior. Like the lean interpretation, according to which infants simply want to get attention, the interpretation that pointing operates as a question shares the intuition that infants expect a response addressed to them in response to this act. Liszkowski et al. (2004) have demonstrated that infants are not satisfied merely with a response directed at them in which the referent is disregarded. We predict, however, that a positive “sharing” response that does not provide any information would not satisfy the infant either. Would infants be happy with a smiling adult who establishes “joint attention” with them by alternating

her gaze between the infant and the referred object without voicing any response?

Perhaps the most obvious way of ascertaining *why* infants point would be to explore the reactions they generally receive as a result of their pointing. Although there is some evidence that adults tend to interpret infants’ pointing behavior as requests for information (Racine, 2005), we are not aware of any systematic study addressing this question. Our account predicts that adults would primarily respond by naming, operating, describing, or evaluating the indicated object or event.

Like the “rich” interpretation, our proposal also agrees with the suggestion that infants’ pointing actions “express their interest” in the referent—in the same sense as all questions implicitly express the interest in the expected answer. We think, however, that this is not sufficient ground to call these actions “expressive,” especially if there is only one predicate (i.e., interest in the referent) that is expressed in all instances of pointing. What is expressed in infant pointing, according to our proposal, is the infants’ wish to receive some information about the referent, rather than their interest that they want to share merely for the sake of sharing. Infants do not seem to openly express much during these actions, and Liszkowski et al. report hardly any facial or vocal communications accompanying them. If, as we propose, pointing represents a question and it is so interpreted by communicative partners, infants do not have to express anything; it is the partner’s job to express something, and infants should expect this.

It is also remarkable that infant’s pointing is almost always directed toward adults. If infants point to share their interest or excitement with another person, they should point to anyone who is attending to them, irrespective of the likelihood that this person is perceived as a knowledgeable or potential informant. Do infants also point in the presence of other infants and attempt to direct other infants’ attention toward objects or things that interest them? We know of no documented cases of this kind of interaction. If infants are pointing to request information about an object or an event, presumably they should not point for other infants because they are unlikely to be good informants.

Communicative Intention

Human communication is ostensive, that is, it makes manifest not just the message but also the very fact that it is being intentionally communicated. This aspect of communication is necessary in order to let the intended recipient know that the information

available in the message is optimally relevant to her (Sperber & Wilson, 1986), and determine the frame in which it is to be interpreted (the “common ground”).

Tomasello et al. are cautious about interpreting early pointing as reflecting this aspect of human communication, and they are rightly so. While there is plenty of evidence showing that even younger infants tend to interpret ostensive signals as introducing communication from the source (Csibra & Gergely, 2006), and try to get adults’ attention to themselves (e.g., through establishment of mutual gaze) when they want something from them (Gómez et al., 1993), there is no convincing evidence showing that infants around 1 year of age intend to let the other know, beyond their message, their communicative intention as well. This would be crucial for the account put forward by Tomasello et al. because a declarative message would be interpreted differently if it is not perceived as intentionally communicated. If infants were happy with the other person obtaining the needed information from their pointing (in the case of “informative pointing”), or with the other person expressing the same attitude toward the indicated event as the infants (in case of “sharing”), without detecting the source of this information, their behavior could not be classified as truly communicative. The response that the infants should expect in these situations (finding the displaced object, or appreciating the interesting event) is the same whether or not the infant’s communicative intention is recognized. Tomasello et al. have to invoke further assumptions about general motivations for shared intentionality to account for why joint attention is an important factor for infant pointing. After all, the informative and expressive pointing gestures they elicited from the infants in their studies could, in principle, be interpreted without reference to a common ground.

Interpreting infant pointing as an interrogative act may avoid this ambiguity. If infants intend to make their communicative intention (i.e., their “question”) explicit, they should not be satisfied with an informative response (a demonstration, a verbal label, etc.) that is not addressed to them. Some aspects of the data presented by Tomasello et al. suggest that this is indeed the case. Infants do not just expect a response that could fulfill their need for information, but expect the adult to acknowledge their question by addressing the response directly to them (Liszkowski et al., 2004). Our own account, according to which infants point to objects/events in order to obtain information about them, explains why infants want the adult to attend both to the pointed-at object/event (to react to the referent) and the infant (to

acknowledge the question) in response to their communication. While declarative communication does not necessarily imply a dialogue, interrogative communication does, which explains why the situation commonly characterized as “joint attention” is required for infant pointing.

Communication and Cooperation

Our view is that the new look offered by Tomasello et al. on infant pointing is correct in one of its main claims while it may be too bold in the other. We applaud the careful demonstrations that infant pointing is a true communicative act, and not just a conditioned response, from the outset. However, claiming that this act is driven by deeply social cooperative motives seems to go too far. We are skeptical about this explanation of infant pointing not because we deny the existence, or the possibility of existence, of such motives in infants. However, in real life, the chance that infants could really help adults by providing them with crucial information is slim, and the function of joint contemplation on particular objects or events (i.e., “sharing”) is not clear. This ubiquitous form of early communication must have a more utilitarian function. We think that it is plausible to assume that it serves the infants’ selfish needs to learn about the world in a uniquely human way: by communication.

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