



Universidad Autónoma
de Madrid

Biblos-e Archivo
Repositorio Institucional UAM

Repositorio Institucional de la Universidad Autónoma de Madrid
<https://repositorio.uam.es>

Esta es la **versión de autor** del artículo publicado en:
This is an **author produced version** of a paper published in:

Cognitive Development 36 (2015): 142-149

DOI: <https://doi.org/10.1016/j.cogdev.2015.09.005>

Copyright: © 2015 Elsevier Inc. All rights reserved.

This manuscript version is made available under the CC-BY-NC-ND 4.0
licence <http://creativecommons.org/licenses/by-nc-nd/4.0/>

El acceso a la versión del editor puede requerir la suscripción del recurso
Access to the published version may require subscription

Ostensive gestures come first:

Their role in the beginning of shared reference

Abstract

In developmental psychology pointing gestures are widely accepted as the gesture that par excellence allows shared reference (Cyrulnik, 2002; Liszkowski, Carpenter, Striano, & Tomasello, 2006), and as the basic form of gestural reference (Leavens, Hopkins & Bard, 2008; Pika, 2008). However, in semiotics, it is ostensive gestures that are considered to be the first instance of active signification, that is, gestures where an object occupies a prominent place as an instrument of communication (Eco, 1976). In this paper, coming from the pragmatics of the object perspective (Rodríguez & Moro, 1998), we argue that it is not pointing but ostensive gestures that come first. Specifically, we argue that: (1) ostensive gestures are gestures; (2) a developmental understanding of gestures suggests that children understand and produce ostensive gestures before pointing gestures, and adults produce ostensive gestures with objects in a shared space with the child at a very early age long before pointing gestures; (3) a theoretical and pragmatic conceptualization of objects beyond their “physical” level is required. Objects are cultural products with public functions; as a consequence, objects are also powerful instruments of communication between people, especially during the first years of life, and not simply the setting that surrounds the communicative event. Finally, we discuss the implications of these notions for developmental psychology, going beyond the declarative and imperative functions. We discuss three new functions of ostensive gestures: (1) for oneself with an exploratory and/or contemplative function, (2) private with a self-regulatory function in order to solve a problem, and (3) to another with an interrogative function.

Keywords: Ostensive gestures, Pointing gestures, Shared reference, Object uses, Early Semiotic development

Introduction: Why pointing gestures cannot be the basic form of gestural reference

In developmental psychology primacy is traditionally assigned to the pointing gesture as *the* gesture that *par excellence* allows shared reference (Cyrulnik, 2002; Liszkowski et al., 2006; Matthews, Behne, Lieven & Tomasello, 2012); “pointing serves to refer as precisely as possible to objects for joint attention” (Butterworth, 2003, p. 29). This idea is also widely accepted among primatologists: “the basic form of gestural reference” (Pika, 2008, p. 165); “the quintessential example of nonverbal explicit reference” (Leavens et al., 2008, p. 187). In other words, two people share the same referent due to the pointing gesture that one of them intentionally produces, in the distance, to communicate something to the other person in relation to an object, an action or an event. Twelve-month-old children already evidence this skill. Understanding pointing gestures implies that children are already capable of shared experience “[...] a mental level involving an understanding of the intentions, attention, and knowledge of their partner” (Tomasello, Carpenter & Liszkowski, 2007, p. 720). The most highlighted communicative functions, since the classic works of Bates et al. in the '70s, have been the declarative and the imperative functions (Brinck, 2004). However, this has been recently challenged in the literature. Pointing gestures can in fact fulfil more than just these two functions. Pointing gestures can be used to point to absent referents, to communicate with adults in order to share attitudes, to inform them of something they wish to know (Liszkowski, Carpenter & Tomasello, 2007), or with an interrogative function (Southgate, van Maanen & Csibra, 2007). Additionally, pointing gestures can also be used as a tool to regulate one's own behaviour (Rodríguez & Palacios, 2007; Delgado, Gómez & Sarriá, 2010).

Nevertheless, it is not easy either to use or to understand a pointing gesture. Children at 6 to 8 months old, instead of looking at the *direction* that the pointing gesture indicates, look at the *finger* itself (Butterworth, 2003). Therefore, the understanding that pointing gestures refer to distal objects emerges relatively late in development. If we

consider the production of pointing gestures, they require the mastery of several aspects: (1) the *gesture itself* (2) the understanding that it refers to *something* that is (3) located *in the distance*. It is necessary to coordinate all this, besides, (4) the *other person's attention*, that also occurs in the distance, and also, (5) the child points *for a reason*, the gesture has a *function*, and the child expects to be understood by the other. The communicative function of the gesture can change depending on (6) the *thing* being pointed at: it is easy to conclude that the pragmatic effects of communication can change dramatically depending on whether the child points at the moon, the chimney, or at a cake that a sibling is eating (Rodríguez, 2006). Therefore, apart from the complexity emphasised by other researchers, we also include the complexity derived from considering 'what in the world' is indicated. Otherwise, it would be impossible to determine the *purpose* of the child's pointing, what his/her expectations are, or how he/she is intending to affect the other person. In other words, it would be impossible to know its pragmatic dimension.

It is not clear how children manage to achieve such a complex degree of communication *with somebody about something*, in a *distal* way –characteristic of pointing gestures– if, during the first year of life, they have not acquired *previous* intentional behaviours. That is, they must have acquired behaviours which already imply shared reference in basic communicative situations, with less complex semiotic systems than pointing gestures, which can serve as the basis in which pointing gestures can develop. It seems reasonable to think that in such situations of shared reference, it is necessary to *approach the object*. This implies that the 'common agreement' does not occur with an empty hand in the distance, as it is the case of pointing gestures, but in a *proximal space* involving the *object itself*, i.e., with the hand occupied by the object.

This is precisely the main feature of *ostensive gestures* –the presence of an object which facilitates understanding in the absence of spoken language and pointing. We need to highlight that we prefer the general term 'ostensive gesture', although in the psychological literature, since the works of Bates, Camaioni & Volterra (1975) these

gestures have been referred to as 'giving' or 'showing' (both, together with pointing, are "deictic gestures"). However, giving or showing the object is, in our view, insufficient to determine the *function* of the gesture: *why and for what* is the child giving or showing something? In our view, it is more accurate to say that the child produces ostensive gestures and, only later, comes to intend their particular function. Furthermore, we propose three possible functions of ostensive gestures beyond those typically referred to as imperative and declarative, (1) an *exploratory* and/or *contemplative* function, (2) a *self-regulatory* function in order to solve a problem, and (3) an *interrogative* function.

From a semiotic perspective, the explanation of why ostensive gestures are easier to understand is clear. In the case of pointing gestures, sign and referent –what is being pointed at– do not coincide. It is a *heteromateric* sign. The child must learn that in relation to a pointing gesture, the relevant content is *not found in the finger*, but in what is pointed at, *in the distance*. However, in case of ostensive gestures, with the hand occupied by the object, the gesture is sign and referent simultaneously. Ostensive signs are *homomateric*. Therefore, it is easier for the child to understand that the meaning concerns *this* which is being shown.

A further point to make about ostensive signs is concerned with their diverse pragmatic complexities. If we consider the communicative actions of both the adult and the child throughout the first year of life, it is necessary to distinguish between ostensive and indexical gestures. As indicated before, they entail different semiotic complexities. Ostensive gestures are clearly understood and produced before pointing gestures (Rodríguez & Moro, 2008). When exploring developmental processes during the first year, it is imperative to consider that, according to semiotic theorists, ostensive gestures are the most basic form of active signification. We will come back to this important point later on. In developmental psychology, meanwhile, these types of gestures are not distinguished as clearly as they should be. Since Bates et al. (1975), 'deictic gestures', that is, gestures used to communicate referentially, have included both pointing and giving or showing, or, as recently stated by Liszkowski: 'intentionally communicative

gestures have been classified into deictic and representational gestures [...] Deictic gestures show or *present* a referent in the environment [...], the most prominent gesture being pointing' (Liszkowski, 2010, p. 38, underlined in the original). Representational gestures are those that stand for an absent referent.

Furthermore, to our knowledge there is no research concerning the effect of the adult's ostensive gestures on children during the first months of life. To understand how adult's ostensive gestures affect children would also allow an understanding of how children come to produce them and with which function(s).

Ostensive gestures: the first form of shared reference

We propose that ostensive gestures constitute the first form of shared reference. This proposition has three significant implications for psychological research:

1. Accepting that ostensive gestures are gestures on their own right.
2. Adopting a developmental perspective, given that children understand and produce ostensive gestures before pointing gestures. The *decalage* between both of them during the first year is obvious.
3. Accepting that objects have cultural and public properties and that communication occurs with and about objects. Objects are the key to understanding the functions of gestures.

Let us consider these three points in more detail.

Ostensive gestures are gestures

When considering research on gestures, it is important to know what developmental stage studies focus on. As pointed out by Andr en "[T]he question of how to handle the upper and lower limits of gesture is clearly at the same time difficult and central to understanding the nature of gesture" (2010, p. 14). Before explaining why

ostensive gestures are gestures in their own right, we will describe research traditions that do not study, or do not consider, ostensive gestures as gestures.

In the field of pragmatic linguistics, there is an increasing interest in gesture-speech integration in early language acquisition (Murillo & Belinchón, 2012). In relation to adult communication, Kendon's works are specially relevant. For him, gestures are regarded as part of language itself and it is used: "[...] as a mode of symbolic representation, just as spoken language is" (2000, p. 50). Also, according to McNeill "[...] language and gesture are integral parts of a whole", where gesture and speech form a "multimodal unit that is considered as language itself" (2000, p. 9). In the field of second language acquisition, gestures "should be seen both as a resource in learning and as a component of language proficiency in its own right" (Gullberg, de Bot & Volterra, 2010, p. 11). In addition, spatial gestures (Dasen, Changkakoti, Abbiati, Niraula, Mishra & Foy, 2009) in different linguistic traditions reflect "people's representations of the spaces they inhabit, know, and talk about" (Haviland, 2000, p. 13). These studies are positioned at the upper limit, where gestures and language form a consolidated, unified and significant whole.

In a different research area, a study with 6 year old children on gestures by Susan Goldin-Meadow et al. (2012), shows that doing a particular gesture has a bigger effect on learning than only seeing that gesture. Depending on the task, a pointing gesture might not be the most appropriate. A 'move gesture' involving mental rotation might be required instead.

Representational gestures, such as gestures of affirmation and negation, with or without accompanying speech, have been studied during the second and third year of life (Guidetti, 2003). In adults, these gestures refer to emblematic gestures in different cultures (Matsumoto & Hwang, 2013). In this research field ostensive gestures do not play any role, due to the predominant idea that when a hand is not empty there is no gesture, but only solitary action.

The interesting work of Morris, Collett, Marsh & O'Shaughnessy (1979) proposes that some highly symbolic gestures could have had a close relationship in the past with different types of action with the material world or with animals having certain attributes. For instance, the horizontal horn-sign, with the hand pointed forward and the forefinger and the little finger extended horizontally with the meaning of "protection". This gesture originated in pre-Roman times, and in its earliest role, the gesture was essentially a device for self-protection: the horns were being used as "representing the defensive power of a great horned animal, almost certainly the bull" (p. 137). Another very nice example is the gesture of "no" by shaking the head from side to side or by the head-toss gesture. They refer to the explanation given by Darwin in his book *The Expression of the Emotions in Man and Animals*. According to Darwin, the "no" gestures originated in the infant's primary act of food rejection. The authors add that the head toss for negation "can therefore be derived from any small, incipient movement of head `retreat" (p. 162-163).

A third group of studies seems to challenge the status of ostensive gestures as gestures. Mats Andrén's work illustrates this position. Andrén studies gestures between 18 and 30 months of age, where the material –that is, object– world is often involved. However, when considering the first productions, he distinguishes between 'social actions' and 'gestures': "[...] First intentional gestures appear, around the end of the first year when one finds the first pointing gestures *and some other social actions* such as GIVE and SHOW" (2010, p. 6, our emphasis, capitals in the original). The distinction between 'social actions' for showing and giving *versus* pointing gestures, questions the status of ostensive signs as gestures.

We find the same uncertainty in Nicla Rossini's work when she distinguishes deictics (pointings) from "[...] reaching towards objects and extending objects to others [...]" (2012, p. 34), which she does not consider to be deictics. Rossini explains this categorization, based on the classic works of Werner and Kaplan, Bruner or Bates et al., by stating that: "The first studies exclusively focused on pointing gestures, or deictics [...]"

since their *object-distinguishing function* was considered a precursor to verbal naming” (Rossini, 2012, p. 34, our stress). Liskowski adopts a similar position concerning ostensive gestures: “infants from around 9 months also pick up objects and hold them out with an outstretched arm [...]” (2010, p. 39). Based on Clark’s work, he refers to ‘placing’ when the child places an object on the parent’s lap. Both of these gestures are considered deictic: “*showing and placing are thus good candidates for crediting infants with intentional deictic referential communication* and may reflect foundations of uniquely human communication” (*ibid.*, our emphasis). However, the possibility of objects being part of intentional communication is then denied when he asserts:

“However, it is not clear precisely how these gestures work from the infants’ point of view. There are no experiments to my knowledge, which have directly tested referential intent underlying infants’ showing or placing. *Since these gestures involve objects at hand, a leaner interpretation is that they originate from individualistic object-directed actions.* For example, infants may shake objects as an exploratory activity, while parents interpret this as communicative object exposure” (p. 39, our emphasis).

In spite of the fact that Bates et al. did not question the intentional and communicative status of gestures with objects –defining the declarative function as “the use of an object (through pointing, *showing, giving*, etc.) as the means to obtaining adult’s attention” (1975, p. 209, our emphasis)– in recent years, the idea that when an object is placed in the hand of the child a solitary action is being performed rather than a communicative act has gained acceptance. This reasoning assumes that action (with objects) and communication (necessarily *without* objects) develop through completely parallel lines that never converge.

In order to understand the communicative status of a gesture (see discussion in Rodríguez, 2009), one must consider at least three aspects: (1) the *gesture* itself. Which type of gesture is it –ostensive, indexical or symbolic/representational? (2) what part of the *world* is being referred to or represented by the gesture? Gestures cannot be interpreted, especially ostensive and indexical ones that operate with a present referent, without considering in pragmatic terms what part of the world they are referencing. Therefore, one must consider the functions of objects, beyond their physical properties,

and (3) in which specific communicative circumstances (after and before which actions) in relation to the uses of objects, situation, etc., is the gesture produced?

According to Clark (2003), in adult communication, not only is pointing a communicative act, but so also is placement. He concludes that we must “revise our views of both communication and context. Much of what is now called *context* are really acts of communication” (p. 244).

In semiotics, ostensive gestures serve the purpose of intentional communication. Given the fact that objects can also operate as signs, the fact that the hand is holding an object is not an issue. Thus, for Osolsobè, an ostensive gesture can be defined as “a type of communication where the reality itself, the thing, the situation, or event itself functions in the role of message” (1971, p. 35). Communication through ostensive gestures as used in semiotics was originally adapted from Wittgenstein and Russell (Dégh & Vázsonyi, 1983). In *A theory of semiotics*, Eco states:

“Ostension represents the most elementary act of *active* signification and it is the one used in the first instance by two people who do not share the same language; sometimes the object is connected to a pointer, *at others it is regularly picked up and shown*: in both cases the object is disregarded as a token and becomes, instead of the immediate possible referent of a mention, the expression of a more general content” (1976, p. 225, our emphasis).

Ostension occurs when a given object or event produced by nature or human action (intentionally or unintentionally and existing in a world of facts as a fact among facts) is ‘picked up’ by someone and *shown* as the expression of the class of which it is a member (1976, 224-225 stressed in the original).

[...] if I show a packet of brand X cigarettes to a friend who is going shopping, this ostension can mean two different things: either “please buy some cigarettes” or “please buy this brand of cigarettes”. *Maybe in this latter case I would have to add certain indexical devices, such as tapping with the finger on the part of the packet which bears the name of the brand [...]*

At other times ostension may suggest an entire discourse, as when I show my shoes to someone not in order to say “shoes”, but rather “my shoes are dirty” or “please shine my shoes”. In these latter cases the *object* is not only taken as a *sign* but also as a *referent* and the indication constitutes an act of mentioning [...] “[...] the shoes are first of all viewed as an expression which is made with the same stuff as its possible referent. (p. 225, our emphasis)

We believe these ideas should be of great interest to developmental psychology for three reasons. First of all, as Eco emphasizes, ostensive gestures are the most basic resource when people lack a shared communicative code. Ostensive signs that are homomateric –expression and referent consist of the same object– are interpreted more

easily than other more complex signs, such as pointing, in which gesture and referent are different. This distinction is very relevant in relation to early communicative development. The second reason is that, according to Eco, there is an ostensive gesture when the object is in somebody's hand as well as when an object is connected with a 'pointer', or when indexical devices are added. This is relevant to early communicative development because both the adult, when communicating with the child, and the child herself, when producing his/her first pointing gestures, sometimes produce *mixed gestures* with ostensive and indexical elements. Lastly, the fact that the object is part of the gesture itself does not imply that the expression is not part of a broader content. Eco further explores the idea that an object is an expression of the class of objects to which it belongs. Presenting something as the expression of a class to which it belongs with communicative purposes requires a certain level of abstraction. Therefore, Eco seems to emphasize the more abstract aspects to which the object refers. This is relevant for early development, when, since the end of the first year of life, children have begun to consider objects as part of a class and not as unique specimens (see discussion in Rodríguez, 2012). This is a realm in which children with autism seem to have serious difficulties (Benassi & Valdez, 2012; Sterner & Rodríguez, 2012).

Semiotics, then, has no difficulties in accepting that a hand occupied by an object can act as a gesture that communicates referentially –the object acts simultaneously as sign and referent. There is no doubt then about the intentional communicative nature of ostensive gestures, which are similar to pointing gestures or any other intentional gesture of a more complex representational status, such as the symbolic.

In contrast, in developmental psychology, the resistance to accept ostensive gestures as gestures has to do with (1) the difficulty in accepting that intentional communication, especially in the early developmental stages, also occurs *with* and *through* material objects in their twofold status as signs and referent, which is a necessary requirement for the development of shared reference; and (2) that the object cannot be reduced to a uniform, transparent and literal 'physical reality', and that what

defines the object relates to its uses in everyday life. In the following sections, we will analyse these aspects from a developmental point of view.

Developmental perspective: ostensive gestures are produced and understood first

Children produce their first ostensive gestures to communicate with others at around nine months of age (Dimitrova, 2012; Reddy, 2008; Palacios, 2009), but the first pointing gestures are only produced at around 12 months of age (Butterworth, 2003). This seems reasonable if we consider that ostensive gestures are semiotically less complex than pointing gestures.

When adults attempt to establish shared reference with the child in their first months of life, they do not begin by pointing at something in the distance, but rather they first use ostensive gestures, showing something nearby. Pointing gestures begin to be efficient only later in development. The difference between the comprehension of ostensive and pointing gestures by children is notorious. Children understand adult's ostensive gestures with no difficulties very early on, especially if the object is presented at a short distance. This means that when an adult presents an object to a 2, 3 or 4 month old baby, the baby, from the beginning (1) *looks at* what is being presented; at 3 months old also (2) *grabs* the object or *tries to grab* it; at 4 months old also (3) *anticipates* when an object is presented by an adult that it may also be offered. Adults often accompany their ostensive gestures by rhythmic and sonorous components (Rodríguez & Moro, 2008; Moreno-Núñez, Rodríguez & Del Olmo, *submitted*), and sometimes they also add melody (Del Olmo, Rodríguez & Ruza, 2010). These are redundancies that help ostensive gestures to be truly effective for the baby.

We have also observed a phenomenon that we call the *magnet effect* (efecto imán), which refers to the reaction of the child to the adult's ostensive gesture or ostensive action on the object in a proximal space of joint action. The *magnet effect*

consists of the immediate reaction of the child (like a magnet, hence its name) *in the place where the adult is doing an ostensive gesture or acting on the object*. The child (1) looks at the *adult's action/gesture* and (2) directs his hands towards the *place where* the adult is acting/doing something. This reaction by the child implies a selection of a *significant (meaningful) place*. It implies a convergence with the object-place acted by the other. Seven-month-old children evidence this magnet effect behaviour, although at 13 months of age it is highly reduced (Rodríguez & Moro, 1998). In an ongoing longitudinal study with 9, 11 and 13 month olds (Moreno-Núñez, Rodríguez & del Olmo, *submitted*), we observe: (1) 9-month-olds still produce the *magnet effect*: they abandon (or put on hold) their own action with the object they are *currently* handling *when the adult produces an ostensive gesture*, or an *ostensive action* with another object. This reaction is immediately after the adult's action, as if the adult's action on the object was a magnet, (2) the effect decreases by 11 months and (3) it continues to do so at 13 months.

The interest of the child on the adult's ostensive action, which compels her to act on the same place acted upon by the adult, does not occur in relation to pointing gestures. In a longitudinal study, 7 month olds did not interpret immediate pointing gestures produced by adults as indexical gestures in a context of joint action. Children looked at the adult's pointing gesture in 34.6% of the cases and only acted according to the adult's intentions in 7.6% of the cases, and then only in cases when the gesture was accompanied by actions that facilitated their comprehension. However, at age 10 months children looked at pointing gestures in 56.4% of the cases and used objects in a conventional way in accordance with the adult's intention in 33.3% of the cases. At age 13 months children conventionally used objects after a pointing gesture by the adult in 64.7% of the cases (Rodríguez & Moro, 1998). As pointed out above, Eco considers both a distal and a proximal pointing gesture (e.g. touching part of the packet of cigarettes) as 'indexical devices' (Eco, 1976, p. 225). In the study above, the adult repeatedly points and touches the object in most of the cases (multiple immediate pointing gestures).

Interestingly, in joint action and joint problem solving situations (not just joint attention) in home settings, pointing gestures are often immediate, i.e. physically touching the referent (Carpendale & Carpendale, 2010). This type of gesture becomes a *mixed* gesture, half way between an ostensive and an indexical gesture, which helps to make explicit the adult's intentions as it offers a more direct connection with the referent, accomplishing, therefore, an educative purpose.

In the same period that children produce their first ostensive gestures to communicate intentionally with others, around the 9th month, they also produce immediate pointing gestures directed to themselves (see also, Bates et al. 1979, and Delgado, Gómez & Sarriá, 2010, with older children). By immediate pointing gesture, we mean a pointing gesture touching the referent, the object being pointed to. It is directed to themselves because the gesture does not have an intentional communicative function to the other. The function of these immediate pointing gestures seems to be an 'exploration' of a part of the object, or 'specification of the referent' to the self. For example, children point to a *certain part of the object* as a form of selection of "what I am exploring". This part could be a hole in a construction game cube, the head of an articulated dog figure, or the key of a wind-up toy (Moreno-Núñez, Rodríguez & del Olmo, *submitted*). This behaviour rarely occurs in laboratory settings, where stimuli are distally located, especially in studies focused in eliciting pointing gestures, in which children and adults are not involved in a *joint action* situation.

In conclusion, this *decalage* between the child's *early understanding* of ostensive gestures *versus* the *late understanding* of pointing gestures has been largely neglected in the literature on early development. The reason for this is quite simple. Almost no attention has been paid, in early development studies, to contexts of triadic interaction where adults *communicate* intentionally, establishing shared reference with the child through the *mediation of objects, often accompanied with rhythmic and sonorous components* (components added to the object itself), long before the child communicates intentionally with objects at the end of the first year.

If objects are used for doing things, then, ostensive gestures can fulfil more functions than just giving and showing

Vygotski emphasized the functional diversity of language; and Wittgenstein, as well as Austin, referred to the multiple uses of language. By contrast, with gestures only two functions have been considered. As noted above, since the '70s, based on the work of Bates et al., the two main functions of prelinguistic gestures have been taken to be the declarative and the imperative. However, it seems reasonable to conclude that if objects are used for different purposes in everyday life, ostensive gestures produced by children from 9 months old may also have different purposes or functions. We propose three different types of ostensive gestures: (1) Directed to the self: self directed and private gestures (2) Directed to others.

(1.a) Self-directed ostensive gestures: situations in which the child does not use the object according to its conventional function. Instead of acting with it, the child shows the object to him/herself in a *contemplative* act, whose function appears to be only *exploratory* (Moro & Rodríguez, 2005; Dimitrova & Moro, 2013).

(1.b) Private ostensive gestures with a *self-regulatory function*: these gestures occur in problem-solving situations with complex objects. The child shows the object to him/herself in order to regulate his/her own behaviour in relation to the uses of the object. The child identifies a problem and attempts to solve it him/herself by showing the object to him/herself with the apparent purpose of updating his/her mental representation about the object. This type of behaviour was first described in a case study with an 18-month-old girl with Down syndrome. In this case, the girl knew *what* to do with the object, that is, she understood its conventional function –to place rings on a post– but she appeared to have difficulties with *how* to achieve it by herself. She developed several strategies in order to achieve her goal, such as following with her gaze the trajectory of the ring as she moved it, or carefully studying the ring's position *before* trying to place the ring onto

the post. She carefully regulated her own use of the object using the object itself, which is what is required to solve a problem (Rodríguez & Palacios, 2007)¹. In a separate longitudinal study with typically developing children at ages 11, 13 and 15 months, we also observed children producing private ostensive gestures with a tool in the context of its conventional use *before* proceeding with their action. The ostensive gesture with the tool was produced in a very precise moment of difficulty (see other examples of private productions in Basilio & Rodríguez, 2011). Private ostensive gestures are produced when the child already possesses knowledge of the conventional uses of objects (or tools) –but has difficulties with *how* to achieve that use. Using this type of gesture can be considered as a form of ‘materialisation of consciousness through the notion of sign [...]’ (Bronckart & Bota, 2011, p. 63), due to the meaningful presence of the material world. We consider that these behaviours constitute evidence that children are capable of self-regulation before language by using prelinguistic semiotic systems, where the object plays a key role. Self-directed private gestures are situated in the same continuum of communication with the self brought to light by Vygotski in relation to private speech (Winsler, Fernyhough & Montero, 2009). In a study underway (Basilio & Rodríguez, 2011), again in situations that require self-regulation, we observed that children also use ostensive gestures (either directed to the self, or to the other) with an *evaluative* function. After completing a conventional use of the object, children are ‘satisfied’ with their own actions.

(2) Protointerrogative gestures: the child produces an ostensive gesture towards somebody in order to ‘ask for information or help’, requesting their intervention/regulation in relation to their own actions. The child’s actions will, therefore, be affected by the adult’s reactions, whose intervention was explicitly requested by the child (Moro & Rodríguez, 1991; Rodríguez, 2006, 2007, 2009; Sosa, 2010). Protointerrogative

¹ The girl also used private immediate pointing gestures in the same problem-solving situation. We do not elaborate on this idea here because we are specifically focusing on ostensive gestures.

gestures may be accompanied by vocalisations with an ascending tone. Normally, the child produces a protointerrogative when encountering a difficulty in a specific task and attributes to the other person the *skills* she lacks, or explicitly requests their *opinion* before proceeding with her actions. The child explicitly requests the other's regulation through an ostensive gesture.

Self-directed ostensive gestures, private ostensive gestures with a self-regulatory function, and ostensive gestures with a protointerrogative function are ostensive signs in which expression and referent coincide. Ostensive signs present this twofold quality and are functional in communication (with others or the self) providing that objects are considered, (beyond their narrowly defined 'physical reality'), in terms of their shared norms of use. And if language –paraphrasing Wittgenstein– possesses infinite uses, so do objects.

None of these functions could have been identified without placing objects under a pragmatic lens, meaning that they are used everyday in multiple ways and they are subject to collective norms of use which children progressively acquire in interaction with others, in communicative-educative situations (Sinha & Rodríguez, 2008). The object finally becomes the 'sign of its use' when it becomes a member of a class (Rodríguez, 2012). In this meaning-making process the object acts as a sign thanks to multiple and rich communicative interactions with another person. Without the continuous presence of the signifying material world, and not only as an external referent of communication (Barthélémy-Musso, Tartas & Guidetti, 2013), it would be impossible to understand the functions of communicative signs before language.

Conclusion

We began this paper by emphasising the striking contrast in developmental psychology between the status of (a) the pointing gesture being the prototype communicative tool that allows shared reference, and (b) the absence of status of ostensive gestures, characterized by the hand being *occupied by a material object*. The

underlying reason for this contrast lies in the difficulty within developmental psychology of accepting that objects can be protagonists, a part of the interaction and not just of the context, in interpersonal communication, and especially so during the first years of life.

In reviewing various well-known positions in developmental psychology and semiotics the contrast between them became evident. In the former, in early communicative development the term deictic gesture comprises ostensive gestures (giving and showing) as well as pointing gestures. Furthermore, in recent years a viewpoint that doubts the gestural status of a hand holding an object is gaining acceptance. Only 'empty handed' gestures are considered truly gestures, whereas if the hand holds an object, the communicative and intentional nature of the gesture is challenged and is considered instead a "non communicative" solitary action.

From a pragmatic perspective, however, which recognises the semiotic complexity of the different uses of objects, we argue that three essential issues must be reconsidered. The first issue is that ostensive gestures are intentional communicative tools on their own right. The second is that evidence from development during the first and second year shows a *decalage* between the early comprehension and production of ostensive gestures versus late comprehension and emerging use of pointing gestures. This finding is mirrored when observing child-directed adult communicative utterances. They produce ostensive gestures to communicate with children early in development (in triadic educative interactions), which are effective because infants can interpret these gestures, to some extent, even in the first months of life. However, children can only interpret pointing gestures as a distal indication at the end of their first year of life. This developmental gap can be explained by the different semiotic complexity of ostensive and pointing gestures; the former being less complex, as the material object as sign coincides with its referent, and the latter being more complex, as the referent is distally indicated by the gesture.

Finally, in this paper we attempt to go beyond the two *classic* functions of prelinguistic communicative gestures –imperative and declarative– proposing other

functions that ostensive gestures fulfil in early development, by taking into account to whom the gesture is directed and what its communicative purpose is. We identify (1) *self-directed ostensive gestures* with an exploratory/contemplative function and *private ostensive gestures* with a self-regulatory purpose and (2) an *interrogative function* of other-directed ostensive gestures. These are not the only possible functions of ostensive gestures, and therefore more research is needed in order to understand their complexity and their role in early development.

The multiplicity of functions of ostensive gestures can only emerge when one considers the pragmatics of objects, acknowledging their multiple uses in everyday life in accordance with public, conventional, norms shared by a community. Without considering this added cultural dimension of objects, it is not possible to determine the functions of children's prelinguistic communicative signs.

In summary, and in the light of the arguments presented in this paper, we challenge the notion that pointing gestures are the first shared reference tool, and instead we propose that ostensive gestures are primary. The emergence of shared reference early in life is far from being understood, but if we aim to advance our knowledge in this area, we must consider the central role of ostensive gestures by putting them onto the agenda of the emergence of shared reference.

References

- Andr n, M. (2010). *Children's Gestures from 18 to 30 months*. Lund: Lund University.
- Barth l my-Musso, A., Tartas, V. & Guidetti, M. (2013). Prendre des objets et leurs usages au s rieux: approche d veloppementale de la co-construction de conventions s miotiques entre enfants. *Psychologie Francaise*, 58, 67-88.
- Basilio, M. & Rodr guez, C. (2011). Usos, gestos y vocalizaciones privadas. De la interacci n social a la autorregulaci n. *Infancia y Aprendizaje*, 34 (2), 181-194.
- Bates, E., Camaioni, L. & Volterra, V. (1975). The acquisition of performatives prior to speech. *Merril-Palmer Quarterly*, 21(3), 205-226.
- Bates, E., Benigni, L., Bretherton, I., Camaioni, L. & Volterra, V. (1979). *The emergence of symbols: Cognition and Communication in Infancy*. New York: Academic Press.
- Benassi, J. & Valdez, D. (2012). Ayudas para construir significados compartidos. Uno se materiales visuales en la intervenci n psicoeducativa en ni os con trastornos del espectro autista. In D. Valdez & V. Ruggieri (Comps.). *Autismo. Del diagn stico al tratamiento* (pp. 241-271). Buenos Aires: Paid s.
- Brinck, I. (2004). The Pragmatics of Imperative and Declarative Pointing. *Cognitive Science Quarterly*, 3 (4), 429-446.
- Bronckart, J. P. & Bota C. (2011). *Bakhtine d masqu . Histoire d'un menteur, d'une escroquerie et d'un d lire collectif*. Gen ve: Librairie Droz.
- Butterworth, G. (2003). Pointing is the Royal Road to language for babies. In S. Kita (Ed.). *Pointing. Where language, culture and cognition meet* (pp. 9-33). New Jersey: Lawrence Erlbaum Associates.
- Carpendale, J. & Carpendale, A. B. (2010). The Development of Pointing: From Personal Directedness to Interpersonal Direction. *Human Development*, 53, 110-126.
- Clark, H. (2003). Pointing and Placing. In S. Kita (Ed.). *Pointing. Where Language, Culture and Cognition Meet*, (pp. 243-268). Mahwah, New Jersey: LEA.

- Cyrulnik, B. (2002). De la conscience émergente à la conscience partagée. In F. Rastier & S. Bouquet. *Une introduction aux sciences de la culture* (pp. 81-90). Paris: PUF.
- Dasen, P. R., Changkakoti, N., Abbiati, M., Niraula, S., Mishra, R. C. & Foy, H. (2009). Geocentric gestures as a research tool. In A. Gari & K. Mylonas (Eds.). *Quod Erat Demonstrandum: From Herodotus' ethnographic journeys to cross-cultural research* (pp. 115-121). Athens: Pedio Books.
- Dégh, L. & Vázsonyi, A. (1983). Does the Word « Dog » Bite ? Ostensive Action: A Means of Legend-Telling. *Journal of Folklore Research*, 20 (1), 5-34.
- Delgado, B., Gómez, J-C. & Sarriá, E. (2010). Funciones tempranas del gesto de señalar privado: La contemplación y la autorregulación a través del gesto de señalar. *Acción Psicológica*, VII (2), 59-70.
- Del Olmo, M. J., Rodríguez, C. & Ruza, F. (2010). Music Therapy in the PICU: 0 to 6 Month-Old Babies. *Music and Medicine*, 2 (3) 158-166.
- Dimitrova, N. & Moro C. (2013). Common ground on object use associates with caregivers' gestures. *Infant Behavior and Development*, 36, 618-626.
- Eco, U. (1976). *A Theory of Semiotics*. Bloomington: Indiana University Press.
- Goldin-Meadow, S., Levine, S., Zinchenko, E., Yip. T., Hemani, N. & Factor, L. (2012). Doing gesture promotes learning a mental transformation task better than seeing gesture. *Developmental Science*, 15 (6), 876-884.
- Guidetti, M. (2003). *Pragmatique et psychologie du développement. Comment communiquent les jeunes enfants*. Paris: Belin.
- Gullberg, M., de Bot, K. & Volterra, V. (2010). Gestures and some key issues in the study of language development. In M. Gullberg & K. de Bot (Eds.). *Gestures in Language Development* (pp. 3-33). Amsterdam: John Benjamins.
- Haviland, J. B. (2000). Pointing, gesture spaces, and mental maps. In D. McNeill (Ed.). *Language and gesture* (pp. 13-46). Cambridge: Cambridge University Press.
- Kendon, A. (2000). Language and gesture: unity or duality?. In D. McNeill (Ed.). *Language and gesture* (pp. 47-63). Cambridge: Cambridge University Press.

- Leavens, D., Hopkins, W. & Bard, K. (2008). The heterochronic origins of explicit reference. In J. Zlatev, T. Racine, C. Sinha & E. Itkonen (Eds.). *The shared mind: Perspectives on intersubjectivity*, (pp. 187-214). Amsterdam/Filadelfia: John Benjamins.
- Liszkowski, U. (2010). Before L1. A differentiated perspective on infant gestures. In M. Gullberg & K. de Bot (Eds.). *Gestures in Language Development* (pp. 35-51). Amsterdam: John Benjamins.
- Liszkowski, U., Carpenter, M. & Tomasello, M. (2007). Reference and attitude in infant pointing. *Journal of Child Language*, 34, 1-20.
- Liszkowski, U., Carpenter, M., Striano, T. & Tomasello, M. (2006). 12-and-18-month-olds point to provide information for others. *Journal Child Language*, 7 (2), 173-187.
- Matsumoto, D. & Hwang, H. C. (2013). Cultural similarities and differences in emblematic gestures. *Journal of Nonverbal Behavior*, 37, 1-27.
- Matthews, D., Behne, T., Lieven, E. & Tomasello, M. (2012). Origins of the human pointing gesture: a training study. *Developmental Science*, 15 (6), 817-829.
- McNeill, D. (2000). Introduction. In D. McNeill (Ed.). *Language and gesture* (pp. 1-10). Cambridge: Cambridge University Press.
- Moreno-Núñez, A., Rodríguez, C. & del Olmo, M.J. (*submitted*). The rhythmic, sonorous and melodic components of adult-child-object interactions between age 2 and 6 months.
- Moreno-Núñez, A., Rodríguez, C. & del Olmo, M.J. (*submitted*). Development of ostensive and pointing gestures to the others and towards oneself in triadic interactions in 9 to 13 month olds.
- Moro, C. & Rodríguez, C. (1991). ¿Por qué el niño tiende el objeto hacia el adulto? La construcción social de la significación de los objetos. *Infancia y Aprendizaje*, 53, 99-118
- Moro, C. & Rodríguez, C. (2005). *L'objet et la construction de son usage chez le bébé. Une approche sémiotique du développement préverbal*. Berne-New York: Peter Lang.
- Morris, D., Collett, P., Marsh, P. & O'Shaughnessy, M. (1979). *Gestures, their origins and distribution*. London: Jolly & Barber Ltd. Rugby.

- Murillo, E. & Belinchón, M. (2012). Gestural-vocal coordination. Longitudinal changes and predictive value on early lexical development. *Gesture*, 12, 1, 16-39.
- Osolsobè, I. (1971). The role of models and originals in human communication (the theory of Signs and the Theory of Models). *Language Sciences*, 14, 32-36.
- Palacios, P. (2009). *Origen de los usos simbólicos de los objetos en los niños en contexto de comunicación y de interacción triádicos*. Tesis Doctoral inédita. Facultad de Psicología. Madrid: Universidad Autónoma de Madrid.
- Pika, S. (2008). What is the nature of the gestural communication of great apes? In J. Zlatev, T. Racine, C. Sinha & E. Itkonen (Eds.) *The shared mind: Perspectives on intersubjectivity*, pp. 165-186. Amsterdam/Philadelphia: John Benjamins.
- Reddy, V. (2008). *How infants know minds*. Cambridge: Harvard University Press.
- Rodríguez, C. (2006). *Del ritmo al símbolo. Los signos en el nacimiento de la inteligencia*. Barcelona: ICE Universitat de Barcelona/Horsori.
- Rodríguez, C. (2007). Object use, communication and signs. The triadic basis of early cognitive development. In J. Valsiner & A. Rosa (Eds.). *The Cambridge handbook of socio-cultural psychology* (pp. 257-276). New York: Cambridge University Press.
- Rodríguez, C. (2009). The 'circumstances' of gestures: Proto-interrogatives and private gestures. *New Ideas in Psychology*, 27, 288-303.
- Rodríguez, C. (2012). The functional permanence of the object: A product of consensus. In Martí, E. & Rodríguez, C. (Eds.). *After Piaget* (pp. 123-150). Brunswick, New Jersey: Transaction Publishers.
- Rodríguez, C. & Moro, C. (1998). *El mágico número tres. Cuando los niños aún no hablan*. Barcelona: Paidós.
- Rodríguez, C. & Moro, C. (2008). Coming to Agreement: Object use by Infants and Adults. In J. Zlatev, T. Racine, C. Sinha & E. Itkonen. (Eds.). *The shared mind: Perspectives on intersubjectivity*, (pp. 89-114). Amsterdam/Philadelphia: John Benjamins.
- Rodríguez, C. & Palacios, P. (2007). Do private gestures have a Self-Regulatory function? A Case study. *Infant Behavior & Development*, 30, 180-194.

- Rossini, N. (2012). *Reinterpreting Gesture as Language*. Amsterdam/Berlin: IOS Press.
- Sinha, C. & Rodríguez, C. (2008). Language and the signifying object: From convention to imagination. In J. Zlatev, T. Racine, C. Sinha & E. Itkonen. (Eds.). *The shared mind: Perspectives on intersubjectivity*, (pp. 357-378). Amsterdam/Philadelphia: John Benjamins.
- Sosa, N. (2010). *Comunicación intencional prelingüística: ¿Qué pasa con la función interrogativa?* Diploma de Estudios Avanzados inédito, Facultad de Psicología, Universidad Autónoma de Madrid.
- Southgate, V., van Maanen, C. & Csibra, G. (2007). Infant Pointing: Communication to Cooperate or Communication to Learn? *Child Development*, 78 (3) 735-740.
- Sterner, A. & Rodríguez, C. (2012). Valoración de signos de alarma en autismo entre los 9 y los 16 meses de edad. *Psicología Educativa*, 18 (2), 145-158.
- Tomasello, M., Carpenter, M. & Liszkowski, U. (2007). A New look at Infant Pointing. *Child Development*, 78 (3), 705-722.
- Winsler, A., Fernyhough, C. & Montero, I. (2009). *Private Speech, Executive Functioning, and the development of verbal self-regulation*. Cambridge: Cambridge University Press.