Is Pointing "just" Pointing? Unraveling the Complexity of Indexes in Spoken and Signed Communication [(1)]

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International Congress on "Gesture in the Mediterranean Recent Research in Southern Europe"

Procida (Napoli), October 21-25, 2005

(1) Part of the data and observations reported in this paper are described and discussed, from different perspectives, in Pizzuto (2004; forthcoming [a], [b]), and in Pizzuto & Capobianco (2005).

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Aims of this paper

- Contribute to a clearer understanding of pointing gestures, and more generally of indexical reference through:
- An examination of different functions, different conditions of use, different formal features pointing gestures may have (or assume) in spoken vs. signed communication, and in the acquisition of spoken vs. signed languages.
- On these grounds, question some unwarranted assumptions that we believe hinder appropriate comparative analyses of gestural vs. vocal indexes in human spoken vs. signed communication.

Focus

- Pointing gestures as generic, purely ostensive attention-directing devices in spoken vs. signed communication.
- Pointing gestures used in *signed languages* (SLs) to express universal linguistic categories, most notably: 1st/2nd person reference distinguished from 3rd person and demonstrative/locative reference.
- Pointing gestures used in spoken or *vocal languages* (VLs) as non-verbal or co-verbal devices for expressing similar distinctions, i.e. 1st/2nd person reference vs. 3rd person and demonstrative/locative reference.

Some widely held assumptions we shall challenge

1) Pointing gestures/signs used *in SLs* can be easily compared to purely ostensive, generic attention direction devices that "just point", i.e. somehow "directly" single out real world referents (present in the physical environment), or imaginary referents that are "positioned" at marked spatial "locations" in signed discourse.

2) Pointing gestures (optionally) used *in VLs* for 1st and 2nd person reference can be easily assimilated to purely ostensive, generic attention-directing devices and, in particular, are regulated by the same processing/interpretation conditions proper of pointings towards the extralinguistic reality.

3) The conditions of interpretation of purely ostensive pointing gestures in *sign* and *speech* can be easily assimilated.

4) In the acquisition of *VLs*, pointing gestures for 1st and 2nd person reference appear at the prelinguistic, or earliest linguistic stage, supposedly along with (putatively) "extralinguistic" pointing gestures to objects/locations in the environment (around 10-12 mos of age).

5) Thus, since vocal indexes for 1st/2nd person reference (i.e. spoken pronouns and verb inflections for person) are known to be a fairly late achievement (18-20 mos. on), the gestural and vocal indexes for person reference would exhibit a rather different developmental pattern: the gestural indexes would appear in children's productive repertoires well before the vocal indexes.

Note:

To our knowledge, with the exception mentioned below, there have been no studies documenting the appearance and development of pointing gestures to self and to one's own interlocutor, and how these are related to the development of purely ostensive pointings, on the one hand, and different types of deictic words on the other hand (e.g. 1st and 2nd person reference pronouns and verbs, demonstrative & locative forms, verb inflections for 3rd person).

In this paper we report evidence on this topic from a recent study by Pizzuto & Capobianco (2005).

Theoretical framework

- A broad semiotic, Peircean perspective on the role and functions of indexes in human communication and language ("*no matter of fact can be stated without the use of some sign serving as an index*", Peirce, Collected Papers, 2.305).
- An "unprejudiced" view of gestural elements as constituent components of human language in the face-to-face, oral (as opposed to written) modality of language expression, with the persuasion that gestures need to be much more thoroughly investigated and described if we wish to gain an appropriate understanding of the defining features of human symbolic abilities and language (in line with proposals arising from the work of Kendon, 1980; 1996; 2004; McNeill, 1992; 2000 among others)

- An examination of person reference devices in human language along the lines suggested, *for spoken languages*, by Benveniste (1956;1970), Jakobson (1957), Lyons (1977).
- Following these authors, notably Benveniste (1970), recognize person reference as a universal category of language per se, whose key function is to mark the distinction, in discourse, between protagonists of the act of enunciation (the speaker & addressee engaged in actual discourse), and protagonists of the utterances that constitute discourse.
- Theoretical arguments and empirical evidence suggesting that Benveniste's, Jakobson's and Lyons' account of person reference indexes in *VLs* can be fruitfully extended to the analysis of person reference pointing signs in *SLs* (Pizzuto, 1978; Cuxac, 2000; Pizzuto, 2004 & forthcoming [a]; [b]).

One of the main issues to be explored in this paper: whether the linguistic features that can be attributed to person reference indexes identifiable in both VLs and SLs can (and/or should) be attributed also to at least some subtypes of non-verbal or co-verbal pointing gestures occurring in VLs' communication, most notably those encoding 1st and 2nd person reference as opposed to ostensive reference to place/entities in the physical context.

Data sets to be considered

- Data on pointing gestures/signs in adult signed languages,
- Data from earlier work on the development of pointing gestures and pointing signs in deaf children acquiring sign language.
- More recent data on the development of pointing gestures *and* vocal indexes for person and demonstrative/locative reference in hearing children's early acquisition of spoken language (first two years of life)*.

**From Capobianco's (2006), and Pizzuto & Capobianco, 2005*

Pointing in adult signed languages: gestures directed to the extralinguistic reality or linguistic signs?

- One intriguing (yet not surprising) fact: across many different, historically unrelated signed languages pointing is used to express the universal linguistic category of person reference and more generally to carry out deictic-anaphoric reference.

- In particular one finds...

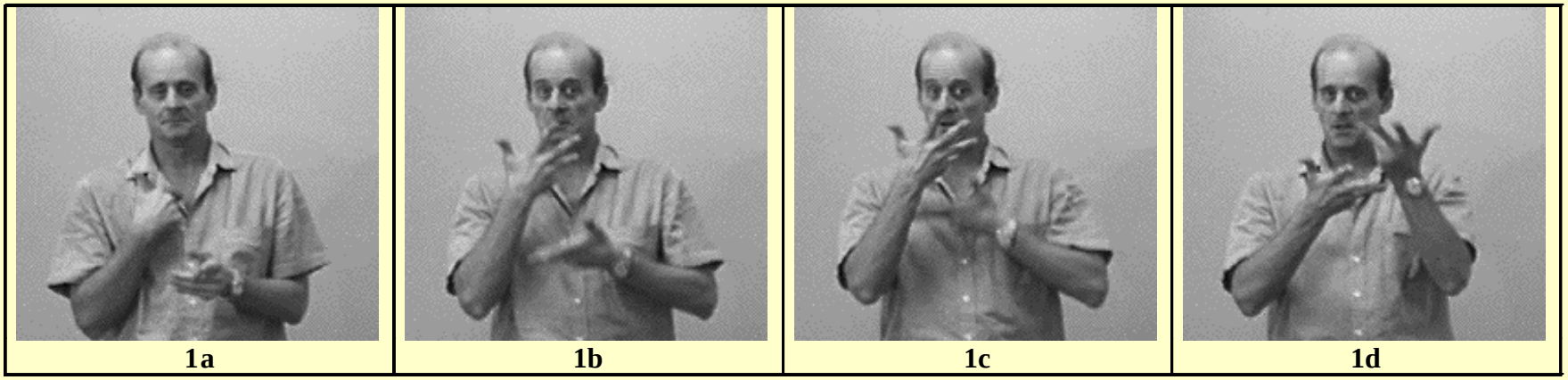
1) Manual indexes for 1st, 2nd & 3rd person articulated with a pointing index finger directed towards:

- the signer (1st p.)
- his/her addressee (2nd p.),
- the non-addressed but physically present participant of a given interaction (3rd p.)
- "abstract" positions in space (or "loci") where 3rd person referents that are NOT present in a given interaction can be marked for the purpose of deictic-anaphoric reference

2) Morphological alterations (often called "inflections") observed in a subset of two-argument verbs (found across signed languages) characterized by two points of articulation: one or both points of articulation (and/or also the direction and orientation of their movement pattern) can be modified to signal 1st, 2nd, 3rd person reference

Some illustrative examples from a narrative text in Italian Sign Language (LIS)*

(1) A manual index towards the signer (1a: “I”, 1st person) followed by a form of the verb “recount” marked for 1st person agent and a 2nd person recipient: the verb form starts at a point near the signer (1b), moves forward (1c) and ends at a point near the addressee (1d).

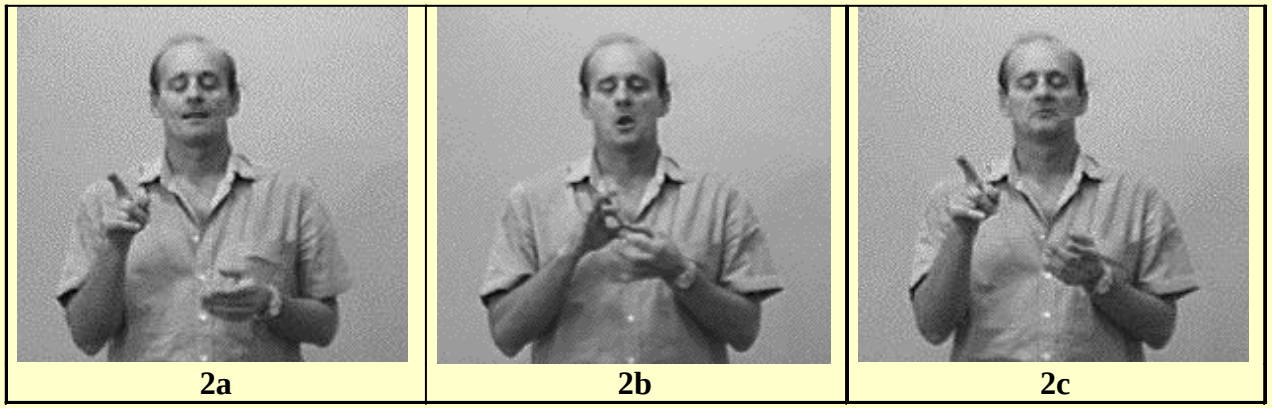


1a | 1b | 1c | 1d

“I recount to you”

*From the ‘Necklace Theft’ corpus (Fabbretti, 1997). Stills adapted from Pizzuto 2004..

(2) Two manual indexes directed towards the signer's right, marking abstract positions in space (or "loci") where a 3rd person referent that is NOT present in context is "located" for the purpose of deictic-anaphoric reference, vehiculating the meaning "he (2a), the colleague (2b), he (3c) [...]".



2a **2b** **2c**

"*he, the colleague, he…"*

The ongoing debate over the linguistic or non linguistic status of pointing signs in signed languages

Different authors have proposed that, even though SLs' pointing signs carry meanings comparable to those proper of VLs' pronouns (and/or of other person reference morphemes in the case of inflected verbs), they cannot be attributed the status of proper linguistic items. They should rather be assimilated, fully or in part, to **ostensive pointing gestures** that are integrated within the linguistic system but are **directed towards the extralinguistic reality** (e.g. McBurney, 2002; Liddell, 2003).

This proposal is grounded on the observation that the spatial locations that can be indicated by pointing signs are

(a) theoretically unlimited in number (hence not specifiable as components of lexical elements)

(b) determined by the context of utterance: the actual locations of physically present referents, when the pointings are directed towards discourse participants or present objects [as in example (1) above], or imaginary locations to which referents are assigned “as if” they were present in the spatial-physical context of the act of utterance [as in example (2) above].

Liddell's position on pointing signs in ASL is particularly representative

ASL pointing signs described as a "blend" of linguistic and non linguistic features. Linguistic features are attributed to the hand shape, certain aspects of the orientation and type of movement that characterize pointing signs. In contrast, the *direction and orientation of the movement* constitute a ***gestural component***, with ostensive properties that are essentially the same as those proper of pointing gestures observable in speech.

"(...) the directionality [of pointing signs] is an explicit, gestural instruction telling the addressee how to map the pronoun's semantic pole. ***The addressee needs only to follow the directionality of the pronoun, which will lead to the appropriate entity***" (Liddell, 2003: 91, *emphasis mine*)

A different proposal, based on:

- The theoretical framework sketched above, and the answers to the following questions:
- Are the conditions of interpretation for the pointing signs used in SLs really the same as those that allow the interpretation of purely ostensive pointing gestures directed toward the extralinguistic reality?
- In particular, what is the gaze behavior of the addressee that must identify the referent of an ostensive pointing gesture? Is this gaze behavior similar to, or different from the one observed when a pointing sign is interpreted?

- It is plausible to assume that in order to identify, in context, the referent of an ostensive pointing gesture one's own visual attention must be directed towards the location that is being "pointed at" in the physical, extralinguistic reality: *to see the moon indicated by a pointing index finger, one cannot look at the finger but needs to focus on the location towards which the gesture is directed* (see later in this paper for one illustrative example in child-adult interaction).
- If this would happen in signed discourse, when interpreting a pointing sign the **addressee** of such a sign should direct his/her visual attention towards the location "being pointed at", and we should observe eye-gaze shifts by the addressee each time a pointing sign is to be interpreted.
- But this is **NOT** what happens in signed discourse...

- Observing signed discourse, as remarked by Cuxac (2000: 217, translated here from French, *emphasis added*):

  "One is struck by *the immobility that characterizes the receiver of the message*: his/her body and face remain still (except for micro oscillations of the head that play a phatic function). *What is most striking, however, is* ***the stillness of [the addressee's] gaze*** . In order to capture the linguistic information provided by the signer's gaze and facial mimicry, *the addressee maintains his/her gaze constantly focused* (with respect to central vision) *on the area around [the signer's] eyes*. Most notably, ***the addressee's gaze*** *is never directed (in foveal vision) on the gestures that are produced, and it* ***does never follow the movements of the signer's hands.***"

- This gaze pattern is observed in the interpretation of *all kinds of pointing signs*, as well as in the processing of non-pointing signs.

- Thus, the receptive (if not the articulatory) features of manual pointing signs suggest that these cannot be easily assimilated to purely ostensive gestures directed towards the physical, extralinguistic reality.

- The very fact that the addressee does not “search in the extralinguistic environment” for identifying the intended referent of pointing signs shows that these signs are interpretable only with respect to the linguistic reality created and sustained by the act of enunciation.

- What is being “pointed at” or “pointed out” are thus not *physically present or imaginary entities* but linguistically based constructs, distinctions and relations.

- A comparative analysis of the pragmatic, semantic and formal constraints that regulate the use of 1st and 2nd vs. 3rd person forms highlights that these constructs, distinctions and relations are substantially comparable in signed and in spoken discourse (Pizzuto, 2004; and forthcoming [a];[b]).

- Additional, indirect but relevant evidence comes from the well-known difficulties SL interpreters encounter, in speech-to-sign interpreting situations, when the speaker they are translating uses pointings to real world objects along with deictic words (e.g. in utterances such as “look at *this* column in *this* graph”, pronounced while illustrating a graph).

- Somewhat ironically, and much unlike what happens for hearing addressees, such ostensive pointing gestures cannot be integrated in the flow of sign, and cannot disambiguate the intended referents, in the same manner as they do in the flow of speech. This happens precisely because ostensive pointings require that the addressee(s) direct their visual attention to the extralinguistic reality…

- Since signers' visual attention is already engaged in processing linguistic information through the *visual channel*, it cannot be simultaneously directed to the extralinguistic spots in the environment that would help them to identify the specific "column" in the specific "graph" the hearing speaker intended and pointed at... (the information to be searched must also be processed through the visual channel, which is already engaged in processing linguistic information...).

- In fact, to overcome these difficulties SL interpreters explicitly demand that, in speech to be translated into sign, speakers *avoid* deictic words with pointings to extralinguistic entities, and replace them with definite descriptions for the indended referent (e.g. “the red column”..).
- These observations are not meant to imply that purely ostensive pointing gestures are not produced in signed communication.
- They are, but co-sign indexical gesturing to the extralinguistic reality *cannot, and indeed is not structured in the same way as its co-verbal counterpart*, especially with respect to the temporal organization of the linguistic as compared to the extra-linguistic information that needs to be vehiculated or attended to…(we have clear evidence on this topic from ongoing research with Italian signers)

- As argued more extensively elsewhere (Pizzuto forthcoming [b]), these observations indicate that, contrary to what is often implicity or explicitly assumed, the conditions of interpretation of purely ostensive pointing gestures in *sign* and *speech* cannot be easily assimilated…
- ...and much remains to be investigated and understood on the integration of visual non-linguistic and linguistic information that must be processed through one and the same primary visual channel, as it happens in SLs.

Pointing in the acquisition of Signed Languages

- Longitudinal studies on children acquiring American Sign Language (ASL) show that the acquisition of pointing signs for person (and possessive) reference follows a pattern that is substantially comparable to that found in the acquisition of spoken pronouns (e.g. Pizzuto & Williams, 1980; Petitto, 1983: 1990; Pizzuto, 1990;).

- However, different approaches have been formulated, and different explanations provided...

- Petitto's approach exemplifies a widely shared assumption: all pointings in human communications are alike ("directly" refer to their referents), but the ASL pointing signs are somehow "linguistically constrained":

"Although personal pronouns in ASL are constrained by the grammar of the language, they are not formed by arbitrary symbols. Rather, they are represented by pointing directly to the addressee (to intend YOU), or self (to intend I or ME) […]. *Thus, the formational aspects of these personal pronouns in ASL resemble extralinguistic pointing gestures which commonly accompany speech and are used prelinguistically by hearing and deaf children.*"

(Petitto, 1990: 155, *emphasis added*)

- Drawing on evidence on two children acquiring ASL, Petitto (1990) has argued that these children produced early “prelinguistic” pointings to self and people around them. Such pointing subsequently disappeared while at the same time the pointing signs that constituted linguistic pronominal forms of ASL appeared. The developmental progression described was interpreted as evidence of “a transition from gesture to symbol”.

- In a longitudinal study of one child acquiring ASL, Pizzuto (1990) did not find evidence of prelinguistic points to self. More importantly for the present discussion, drawing on previous theoretical and empirical work on the structure and the development of deictic-anaphoric terms in signed vs. spoken languages (Pizzuto, 1978; Pizzuto & Williams, 1980), Pizzuto (1990) questioned the legitimacy of assimilating pointing to self and the addressee to purely ostensive pointing gestures -- regardless of whether they are embedded in a signed language or used in spoken communication.

- The acquisition pattern noted in ASL may be interpreted as evidence that pointing to self and to the addressee (not only in signed *but also in spoken communication*) is a more complex cognitive operation than it is commonly assumed, *different in kind* from that regulating the use of ostensive pointing gestures directed towards objects/locations in the environment.

More recent evidence on the development of gestural and vocal deixis in hearing children: Pizzuto & Capobianco's (2005) study

Major questions explored:

- In the acquisition of VLs, is it really the case that, as commonly assumed, the ability to point at oneself, and to one's own addressee develops at the same time as ostensive pointing gestures directed to objects and locations in the environment?

- Or is rather the case that pointing to self and to the addressee follows a different developmental pattern?

- If so, is there any parallelism between the development of the gestural and the vocal devices for person reference that may suggest a common substrate?

- In addition, exploring what is the role of gaze, and diadic gaze engagement, for distinguishing between ostensive pointing gestures, 1st and 2nd person reference points, demonstrative/locative and 3rd person reference pointings.

Data

Longitudinal observations of seven typically developing children, videorecorded (30’ to 45’ samples) in spontaneous interaction with their mothers (occasionally their fathers) in the developmental period from 12 to 24 months

CHILD	GEND	AGE AT EACH OBSERVATION (months)												
1	M	12	13	14	15	16	17	18	19	20	21	22	23	24
2	F	12	14	15	16	17	18	19	20	21	22	23	24	
3	M	12	13	14	15	17	18	19	20	21	22	24		
4	M	12	13	15	16	18	19	20	21	22	23	24		
5	M	12	14	15	16	18	19	20	21	22	23			
6	F	12	13	15	16	18	19	20	21	23	24			
7	F	12	14	16	18	19	20	21	23	24				

Data coding and analysis

- After Capirci et al (1996), as modified by Pizzuto & al (2005), but focusing the analysis on the production of:

  - ♦ POINTING directed towards objects and locations distinguished from pointing to persons present in the room, and from pointing to self and to the addressee (both index-finger and flat-palm forms of pointing were included in the analysis).

  - ♦ Deictic words for demonstrative e locative reference, distinguished from first and second person (including possessive) pronouns, and from verb inflections for first and second vs. third person.

Some examples of children's pointings

1) Prototypical ostensive pointing

1a

1b

1c

A prototypical ostensive pointing produced by one of the children observed (17 months of age). This pointing, oriented towards a spot on the floor (1a-1b), is followed by mother's turning her gaze/visual attention to the spot indicated by the child (1c)

2) Two manual pointings with a demonstrative - ostensive value which partially resemble self- and addressee pointings

2a

2b

Stills 2a and 2b were taken from a longer sequence in which the mother repeatedly attempted to draw the child's attention to a "Winnie-the-Pooh" figure stamped on the child's sweater, naming it and pointing to it, and eventually succeeding in having the child to do the same (2b).

The mother's *manual* pointing in 2a abd 2b, oriented towards and touching the child's chest, exhibits some of the features proper of a "pointing to the addressee". Similarly, the child's *manual* pointing in 2b, oriented towards his own chest, resembles a "point-to-self". However, these clearly inappropriate interpretations were easily discarded by the child and his mother (and by the transcriber of the interaction), not only on the ground of the words that accompanied the manual pointings produced, but primarily on the basis of the *distinctive gaze* used by the two participants, clearly oriented towards the extralinguistic spot where the intended referent was to be found.

3) Mother’s and child’s pointing to self

3a

3b

The child's self-reference pointings in 3a and 3b were deliberatedly stimulated by the child's mother. The mother produced several times the flat-palm-touching-chest gesture illustrated, commonly used in Italian culture and probably in many other cultures to mean "mine/me", to induce the child to say and gesture "mine" for referring to a toy-hat they were playing with (Mother: "how do you say? this is mine! you say it: mine!"). The child eventually produced the same gesture (3a), simultaneously with his mother and, subsequently, an index-finger-pointing to self (3b) while saying "mi" (for "mio"=mine).

Disregarding other aspects of the interaction that would require a more extensive discussion, note the *gaze pattern* that both mother and child employ in articulating these self-referential gestures: mother and child are looking at each other, *focusing their regards on each others' eyes region*. The reciprocal gaze engagement used with these gestures markedly differs from that accompanying ostensive gestures, where gaze is directed to a specific point in the physical environment (compare it with examples 2a-2b).

We believe that this apparently “natural” and “obvious” feature of self- and addressee pointings deserves to be appropriately valued and understood: it seems unquestionable that gaze direction is an essential, defining component in the production and comprehension of different types of pointing. This has been clearly demonstrated for SLs (Cuxac, 2000), but it is clearly relevant in VLs interaction as well. For example, it is easy to verify that the gaze pattern noted in examples 3a-3b is the base-pattern we all adopt, in VLs interaction, when producing self/addressee reference (whether vocal, gestural, or both).

The contrastive analysis of examples 2a-2b and 3a-3b thus reveals that discourse participants’ gaze is the crucial component for discriminating whether a pointing must be interpreted as an instruction to “search in the physical environment for cues to identify the intended referent”, consequently shifting one’s own gaze in the same direction indicated by the manual component of the gesture (as in 2a & 2b), or to maintain one’s own gaze on the addressee, vehiculating or trying to grasp (as, respectively, the mother and the child do in our example 3a & 3b) a very different, and undoubtely abstract indexical relation inherently linked to language.

In our view, contrary to what is commonly assumed, it is inappropriate to conceive and describe pointings that successfully mark the protagonists of the enunciation (speaker and addressee) as “directly” referring to the “entities” that are engaged in discourse.

There is no real sense in which the indexical relation that is “pointed out” is “direct”. This is precisely what is mirrored in the distinctive gaze behavior discourse participants adopt.

If the indexical relation encoded was “direct”, participants would accordingly re-direct their gaze toward the physical, extralinguistic spot being pointed at. The fact they do not do so tells us that the indexical relation encoded is indirect, mediated by a “locution-dependent reciprocal concept” (Bruner, 1975: 273).

The gestural indexes produced, much like their vocal counterparts (the pronouns “I/mine etc”) have, we submit, inherently linguistic, and rather abstract properties. What are “pointed out” are abstract relations, not concrete objects or locations. These relations arise from the actualization of language in human discourse, where speaker and addressee must be considered as necessary parameters of the act of enunciation, as clarified most explicitly by Benveniste (1970).

Turning now to the developmental data, if our hypotheses are correct, we should find that in typically developing children, contrary to what is very often assumed, self- and addressee-pointings do not follow the same developmental pattern as pointings to object/locations in the environment.

It would also be plausible to predict that self- and addressee-pointings develop somewhat in parallel with their corresponding vocal counterpart (i.e. person & possessive pronouns, verb inflections for person).

Results provided by Pizzuto & Capobianco (2005) study

Table 1 - Number of pointing gestures (PTs), deictic words (dw) and verb inflections (VI) for 1st, 2nd and 3rd person in each child's total production

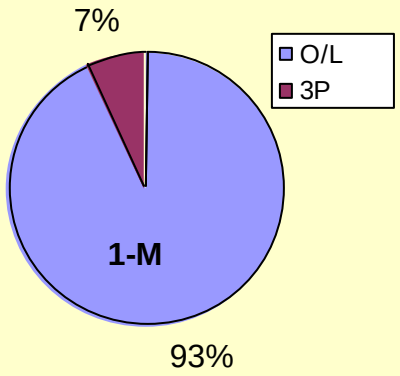
Children *	*1-M*	*2-F*	*3-M*	*4-M*	*5-M*	*6-F*	*7-F*
PTs	270	716	778	336	312	574	279
dw &VI	114	135	434	290	365	1718	417

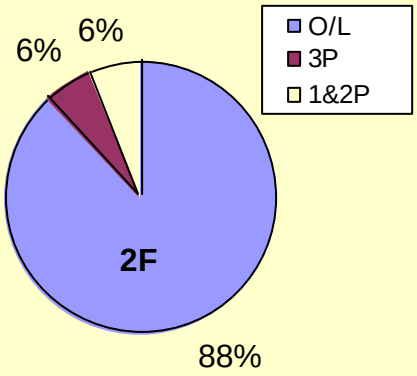
* Hereafter each child is identified through the number and gender-code given in Table 1, where M=male, 2_female.

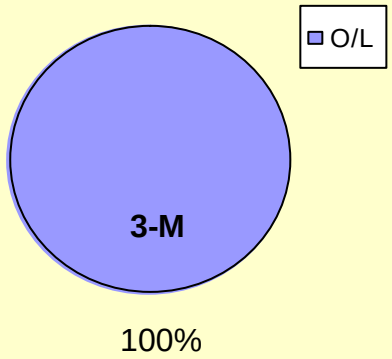
The data show that overall four of the seven children (N. 1-M to 4-M in Table 1) expressed deictic reference more frequently via pointing gestures, and less frequently via deictic words and morphemes. In the remaining three children vocal deictic elements were used more frequently than gestural elements.

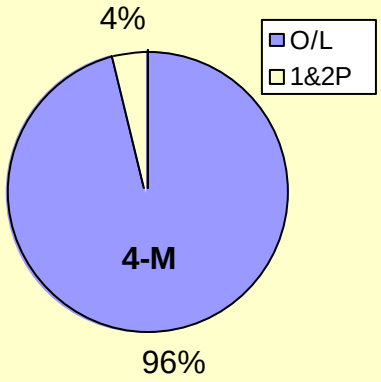
Figure 1: Overall distributional regularities of different types of **pointing gestures** in each child's total production

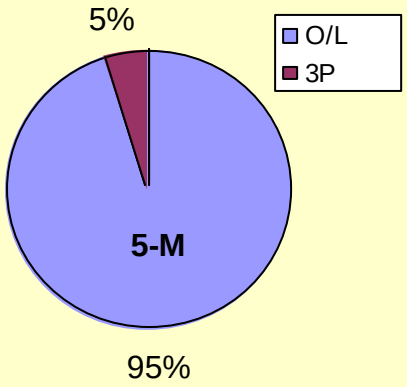
The next slide shows the proportion (%) of pointing gestures directed towards objects and locations (O/L), non-addressed persons present in the context of utterance (People), and to self and the addressee, grouped in a single category (1&2P)

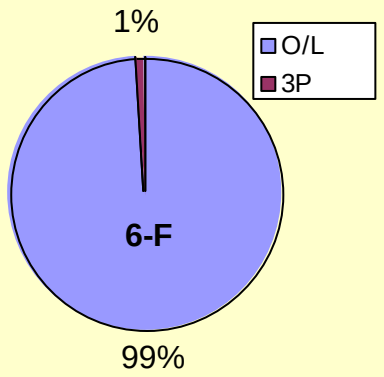












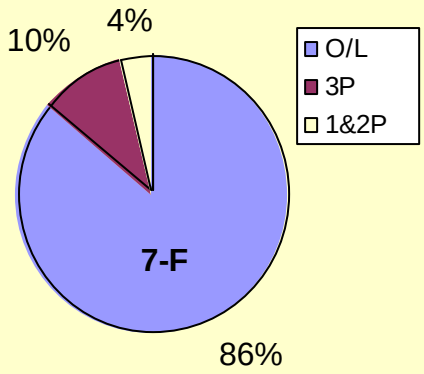


Figure 1 / Gestural deixis

The data in Figure 1 show that in all children the largest proportion or the totality of pointings (86% to 100%) were ostensive gestures directed to objects or locations in the environment [O/L].

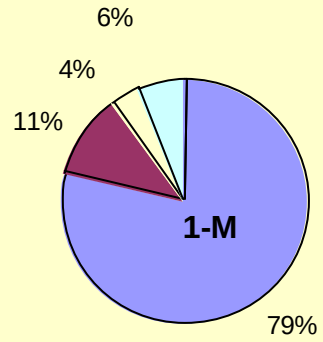
Pointings directed to non addressed persons present in context [3P] were observed in six children, in small proportions (1% to 10%). Child 3-M produce a single 3P pointing which is not represented in the graph for this child.

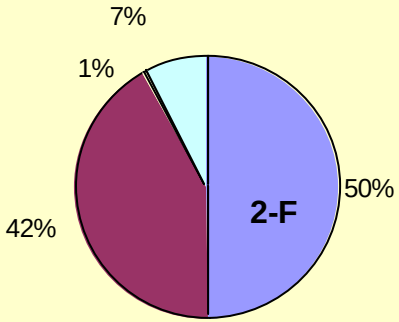
Self- and addressee pointings grouped together [1&2P] were found in five children, again in small proportions: from 4 % to 6% in chi ldren 2-F, 4-M & 7-F, and less than 1% in children 1-M and 3-M (these values close to a “0” proportion are not represented in these children’s graphs)

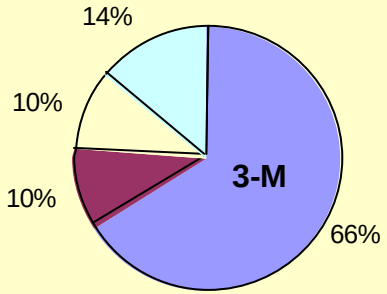
Figure 2: Overall distributional regularities in the production of different types of **vocal** deictic elements in each child's total production

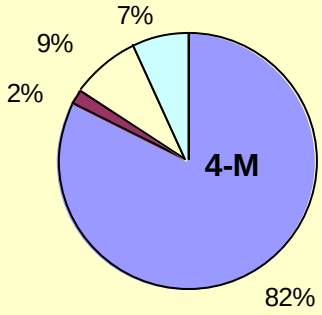
The next slide shows the proportion (%) of demonstrative and locative deictic words (dw D/L), 1st and 2nd person and possessive pronouns (dw 1&2p), verbs inflected for 1st and 2nd person (V-1&2p), and verbs inflected for 3rd person (V-3p).

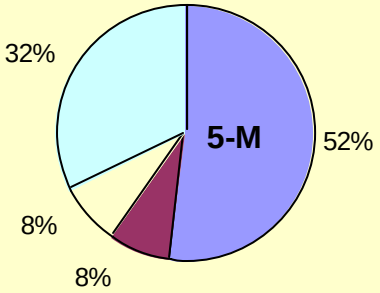
A methodological note is necessary: In Italian, unlike in English, subject person pronouns (i.e. corresponding to "I, you, he/she" etc) are optional, and person deixis is epressed primarily via verb inflections, which are obligatory. Note also that, although all subject pronouns are optional, in early child-adult discourse 1st and 2nd person subject pronouns are certainly more common than 3rd person subject forms, which are often entirely absent from children's early repertoires - as they were in the children of our sample.

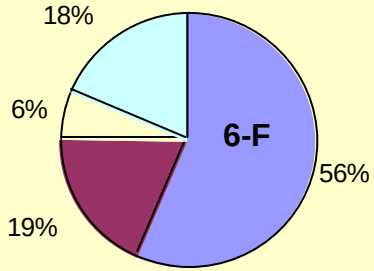


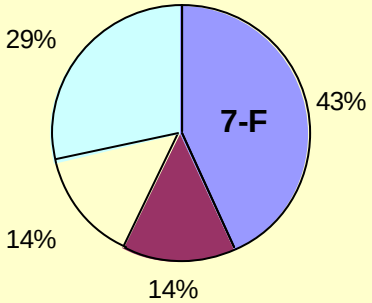












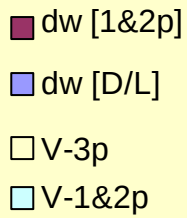


Figure 2 / Vocal deixis

Figure 2 shows that in all children, across samples, deictic words for objects and place, i.e. demonstratives and locatives (dw[D/L], were the most represented type of deictic words (from 43% to 79%). This is partially comparable to what found in the gestural modality.

However, and unlike what found with pointing gestures of comparable meaning, 1st and 2nd person pronouns, grouped in a single category (dw[1&2p]), were well represented in all children's production, in proportions ranging from 2% (child 5-M) to as much as 42% (child 2-F).

Verb inflections for 1st and 2nd person reference (V-1&2p) were also well represented (from 6/7% to 32%).

Grouping together these two subcategories, 1st and 2nd person reference forms constituted on average, across children, 31% of all vocal deictic elements produced.

Third person reference expressed via verb inflections (V-3p) was markedly less frequent (from 1% to 10% in each child's production, on average 7%, across children).

Focusing on 1st and 2nd person reference deixis in the gestural vs. the vocal modality, the data in Figures 1 and 2 clearly indicate that the absence, or very limited use of pointings to self and addressee cannot be attributed to the lack of these referential abilities in the children observed.

In fact, *all* children in our sample were able to use *vocal* devices for self/addressee reference.

By the same token, the sparcity of 1st/2nd person pointings cannot be attributed to a non-productive use of pointing in general, since pointings to objects and locations were used very productively.

These observations suggest, at the very least, that “not all pointings are alike”, and that there are marked asymmetries in the types of deictic elements used in the gestural vs. the vocal modality. These indications are supported by the developmental trends illustrated in the next slides.

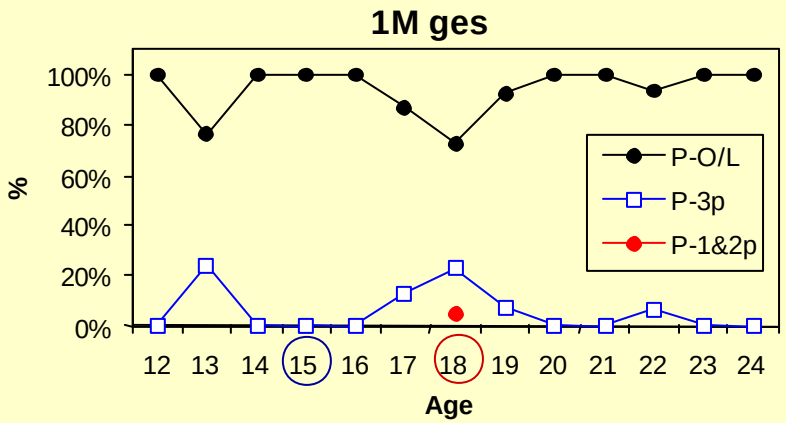
Figure 3: The development of gestural vs. vocal deictic forms in each child's production over time

The graphs in the next three slides show, on the left, the proportion, within gestural deixis, of pointing gestures directed to objects and locations (P-O/L), to self and the addressee, grouped together (P-1&2P), and to non-addressed persons present in the context of utterance (3p).

The graphs on the right show the proportion, within vocal deixis, of deictic words for demonstrative/locative reference (dw-D/L), 1st & 2nd person and possessive forms (dw-1&2P), verbs inflected for 1st and 2nd person (V1&2), verbs inflected for 3rd person (V3p).

In each graph, blue and red circles at specific age-points signal the ages at which each child began combining pointing gestures with their fist recognizable words (blue circle), and producing two-word utterances (red circle).

These two developmental milestones are known to be very important for assessing early communicative-linguistic development (Goldin-Meadow & Morford, 1985; Capirci & al, 1996; Volterra & al, 2005; Pizzuto & al, 2005; Capobianco, 2006, among others).


1M ges
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P-3p
P-1&2p
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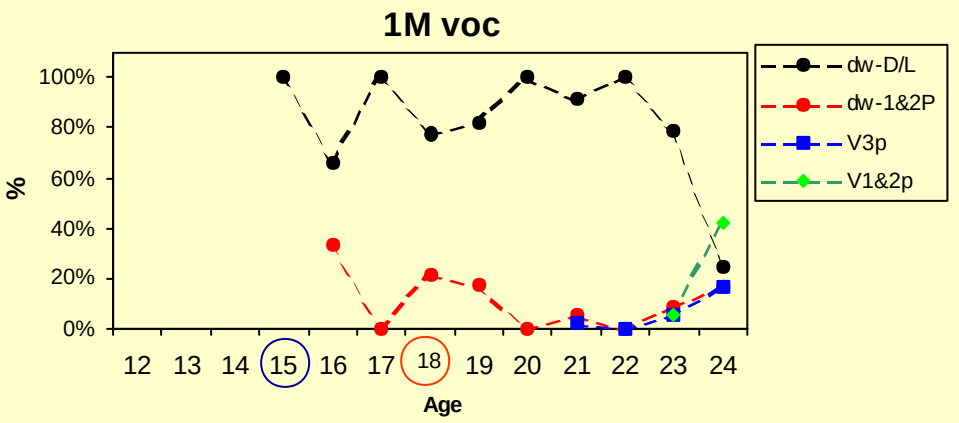
Age


1M voc
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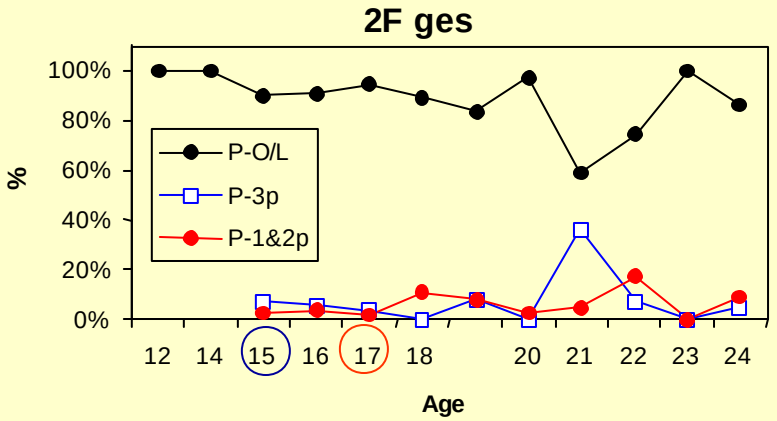
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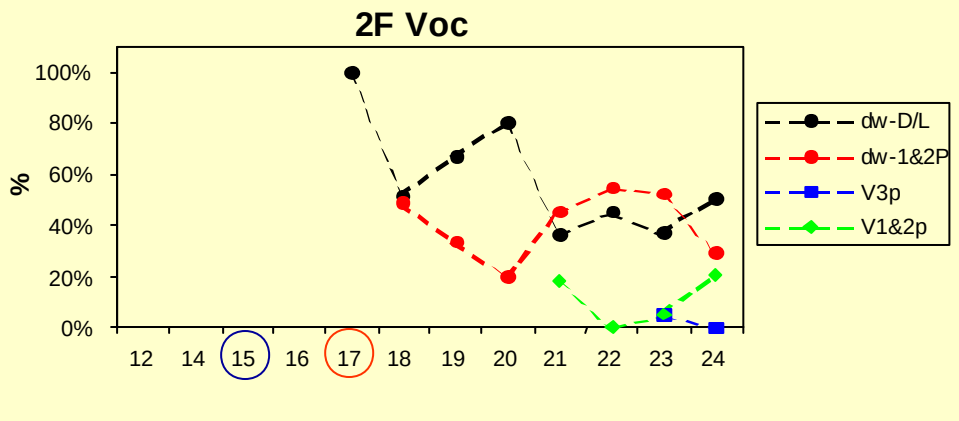
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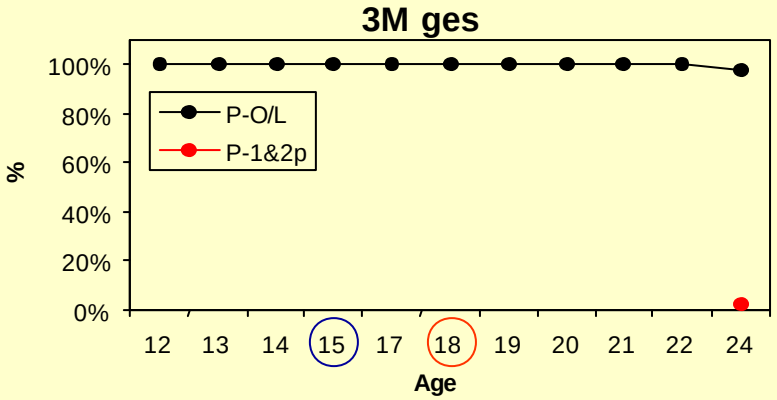
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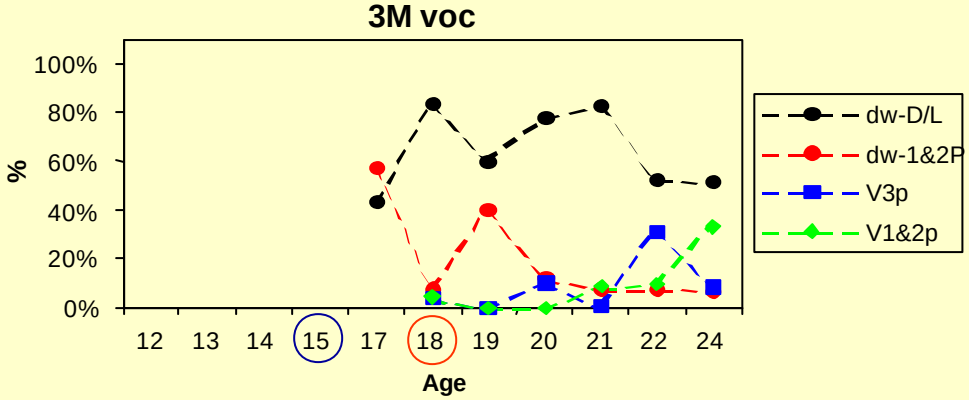
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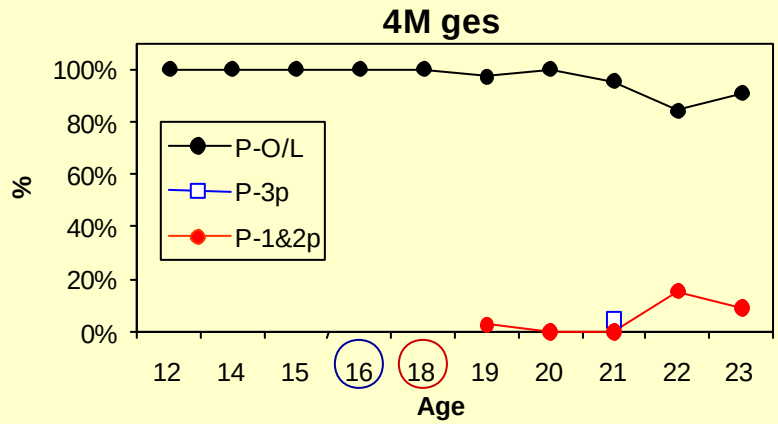
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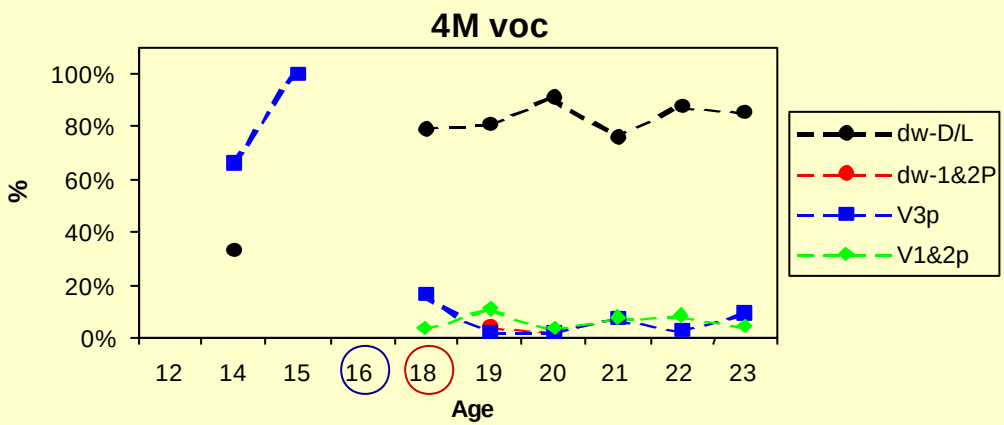
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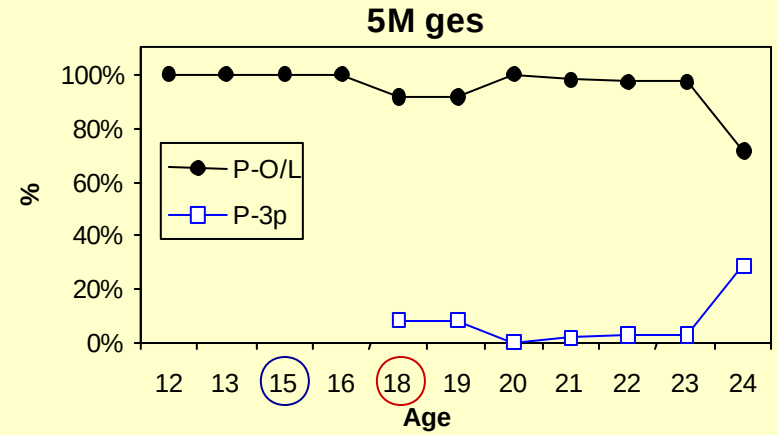
5M ges
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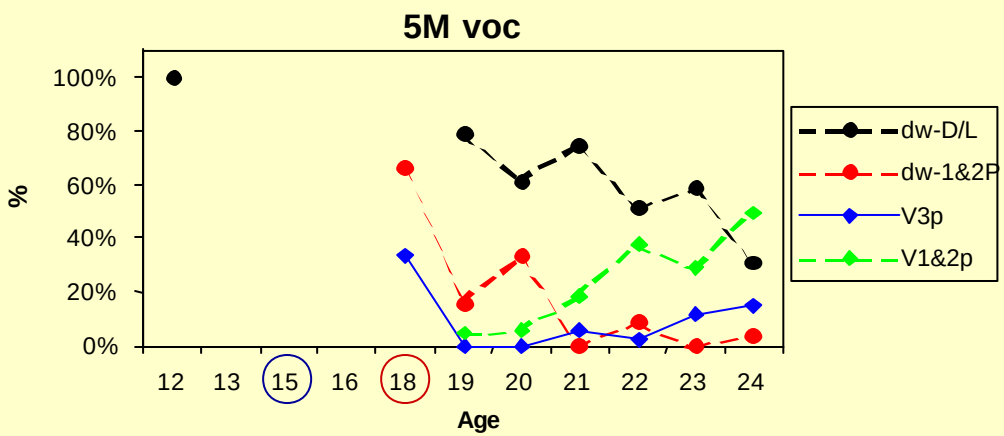
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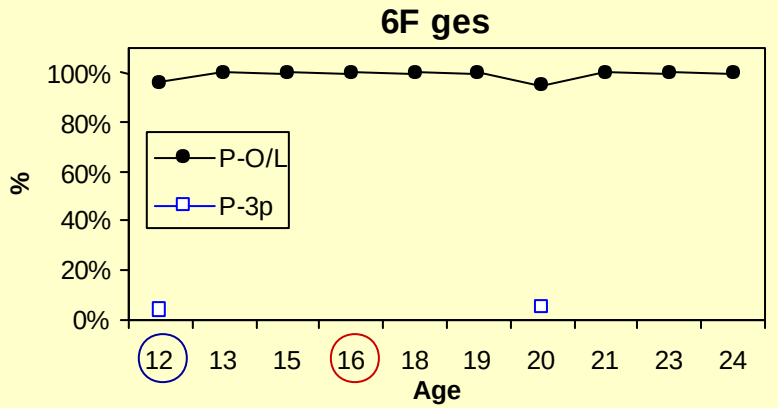
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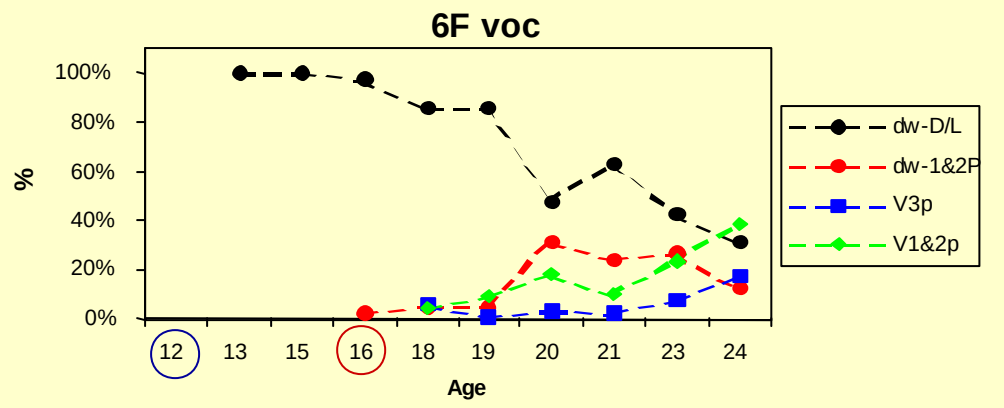
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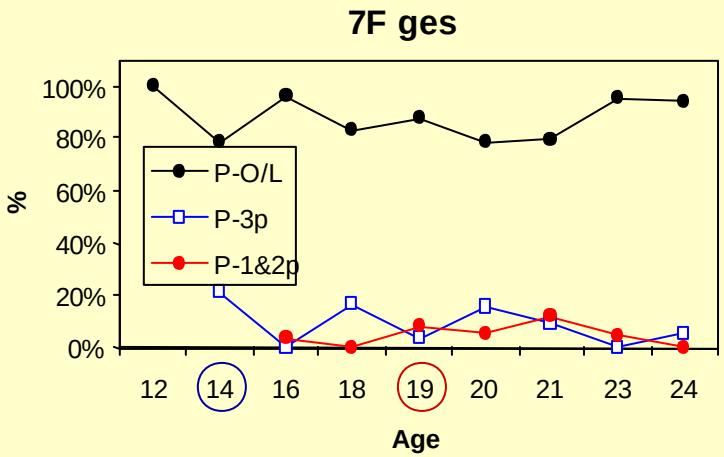
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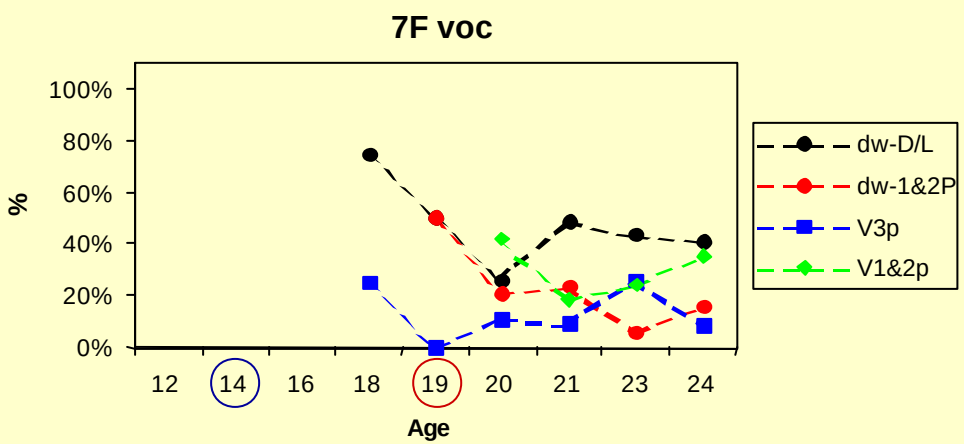
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The graphs in Figure 3 evidence distinct developmental patterns, both within and across the gestural and vocal modalities.

- Within the gestural modality, pointings to objects & locations (P-O/L) were used homogeneously and very productively (compared to other types of pointings) by all children, from the earliest observations (12 months onward).

- In contrast, as already noted (Fig.1), pointings to self/addressee (P-1&2p) were found (almost always in small numbers) in only five children, while they absent from the production of the remaining two children in our sample.

- In those five children who used them (1-M, 2-F, 3-M, 4-M, 7-F9), 1st/2p pointings appeared between 15 and 24 mos of age, three to twelve months later than P-O/L.

- The age and stage of communicative-linguistic development at which 1st/2p pointings were first noted were relatively advanced, and certainly not characterizable as “prelinguistic”

- 1st/2p pointings were found in fact either at the same age/stage (child 2-F), or after children had started combining their first recognizable word with P-O/L (children 1-M & 7-F), or even following the appearance of two-word utterances (in 3-M & 4-M).

- Within the vocal modality, demonstrative/locative deictic words appeared in all children between 12 and 18 mos, i.e. on average from one to six months later than P-O/L and, again at a relatively advanced stage: following the appearance of P-O/L combined with words (children 1-M, 3-M, 6-F & 7-F), or at/following early two-word utterances (2-F, 4-M & 5-M).

- Vocal deixis for 1st & 2nd person reference (via either pronouns or verb inflections) was again found in all children. It appeared between 16 and 19 months of age, shortly before (children 1-M, 3-M), in coincidence with (4-M, 5-M, 6-F, 7-F) or after two-word utterances (2-F).

On the whole, the data on the appearance and use of P-O/L, and of deictic words for demonstrative/locative and 1st/2nd person reference, confirm and expand what has been known for a long time in the literature, on *these* aspects of development.

These data support the idea that *some* forms of gestural deixis precede in development *some other forms* but, crucially, not all forms of vocal deixis.

In fact, our data demonstrate that this pattern holds only for the demonstrative/locative type of deixis. It does *not* hold for 1st and second person deixis. The gestural expression of 1st and second person deixis seems clearly to develop in parallel with, or even subsequently to its vocal mainfestation.

Since, to our knowledge, this subdomain of gestural/vocal expression has not been previously investigated, our data provide new information for a more accurate understanding of the relationships between gestural and vocal deixis.

Concluding remarks

The work we have described supports, from a different perspective, several recent (and less recent) investigations highlighting the complex information that can be vehiculated via pointing gestures of a more or less abstract kind (see among others Kendon, 1980; 2004; McNeill, 1992; Enfield, 2003; the collection of papers in Kita, 2003).

Our investigation pursued a line of thinking partially comparable to that followed by Kendon (2004: 199-224). in his analysis of pointings with different handshapes and orientations in informal, spoken-gestured discourse which encode equally different information.

We explored here other components of pointings: sender/addressee reciprocal gaze engagement, and gaze orientation by the sender. These are interrelated with the orientation/direction of the manual indexes produced, and govern their interpretation in human discourse.

We tried to integrate observations grounded in sign language research, and in developmental research on both signing and speaking-gesturing children.

Sign language research, most notably Cuxac's (2000) analysis of discourse in French Sign Language (LSF), provided us the insight that, in producing and understanding manual indexes, gaze is a crucial element for distinguishing 1st and 2nd person reference from purely ostensive reference to the extralinguistic world (relevant observations on this topic were also made, from a different perspective, in early work on ASL, e.g. Baker, 1977).

This insight, along with questions raised in related work (Pizzuto, 1978; 1990; 2004; forthcoming [a]; [b]), lead us to explore the plausibility of different assumptions widely shared in much current sign language research, but also in developmental research on signing and speaking children.

We hope to have demonstrated that, contrary to widely held assumptions, there are no grounds to support the idea that the orientation/directionality of all pointings is always interpreted as a direct instructions to follow that direction for identifying the intended referent.

Rather, “it all depends”….

And it depends from several critical features that cannot be disregarded if we wish to achieve a more appropriate understanding of the communicative and linguistic behaviors under investigation.

The features that are relevant with respect to the comparative analysis of intra- and extra-linguistic indexes in signed vs. spoken adult discourse were only sketched here, and are discussed more extensively elsewhere (Pizzuto, 2004; forthcoming [a]; [b]).

We dealt more at lenght with the developmental issues, providing new evidence on how 1st and 2nd person reference develops in hearing children’s early gestural/vocal system.

To summarize, the constraints on productivity, and the developmental trends we documented indicate that gestural indexes for 1st and 2nd person reference are NOT an early achievement. They develop in parallel, or subsequently to, their vocal counterpart, at a relatively advanced stage of communicative-linguistic development.

There are thus no grounds to support the widely held assumption that “all kinds of pointings are alike”, and/or that gestures for 1st/2nd person deixis are found at the “prelinguistic” stage.

One implication of our findings is that in hearing children, not just in deaf signing children, the gestural expression of person deixis, as its vocal counterpart, relies on processes that are inherently linked to linguistic communication, most notably to the structure of the act of enunciation as analysed and described by Benveniste (1970).

On these grounds, a reexamination of some earlier accounts on the development of gestural deixis in the acquisition of signed languages is warranted.

We would like to conclude commenting the following statement made by Lyons (1977: 637-638): “There is much in the structure of languages that can only be explained on the assumption that they have developed for communication in face-to-face interaction. This is clearly so as far as deixis is concerned”.

Lyons’ remarks concerned primarily vocal indexes. We believe that they can be appropriately extended to gestural deixis. We also believe that more unprejudiced analyses of both gestural and vocal indexes in human discourse are needed, trying to clarify similarities and differences without a priori distinctions on what has to be classified as “linguistic”, and what must be considered outside the domain of language.

Analyses of this sort can help us to articulate a more precise description of the defining features of real human face-to-face discourse, and of its inherently multimodal structure. It is also plausible to think that they can help us to achieve a more profound understanding of the common substrate underlying signed and spoken languages.

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