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Children's Early Actions in Learning Language: A Study of Proto-words and Pointing Gestures in Interaction between One-year-old Child and Parent

Abstract

The purpose of this article is to study how the meanings of one-year-old children's first proto-word expressions are interpreted in interactions with the parent. We focus our study on interactive sequences that consist of two parts: the first is a multimodal expression (a combination of gaze orientation, a proto-word, and a pointing gesture) of the child, and the second is an interpretation of that expression provided by the parent. These sequences reveal how the parents give explicit form to the implicit content of their children's pre-linguistic communication. Besides offering the adult equivalent word to the child's proto-word expression, parents often structure their interpretations as more elaborate syntactic constructions and combine them with non-verbal action. In doing so, the child's proto-utterances get treated differently either as requests for names or as requests for objects. At the age of twelve months the children also start to acknowledge or reject parental interpretations (and by rejecting, repair the course of action the parent has chosen). The emergence of children's third position repairs enables the negotiation of intersubjective understanding between the interlocutors. In sum, our analysis shows how the acquisition of shared meanings is embedded in the sequences of first proto-utterances and their interpretations in the course of daily activities at home. It also contributes to linguistic research by studying gesture and embodiment as they are used together with language. Within the field of language acquisition studies it emphasizes the role of embodied action in the acquisition of linguistic forms.

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1. Introduction[1]

In this article we show how children's first proto-words, combined with gaze direction and pointing gestures, serve as initiative actions in a conversational sequence. We claim that 12-month-old children actively initiate social activities in the first parts of these sequences, and that the parents' interpretative second parts, the candidate understandings of children's proto-utterances, are a device that parents use to carry over the shared meanings of words, and the social implications of speech, to their children. Thus we claim that this two-part sequence is at least one interactive practice that enables language acquisition.

In the language acquisition process, previous research has described the child as a passive receiver of the parent's linguistic input (e.g., Snow 1995). The interactions that very young children are engaged in are mostly highly routinized activities (eating, washing etc.). The language the parents use in these activities often consists of fairly short utterances that occur with great consistency and frequency in the same daily contexts (cf. Clark 2003: 31–32). As a result, it is seen as quite natural for the child to start naming these objects and actions at about one year of age. However, we do not know exactly how these first words come about. While the focus has been on the input of the parent, the actions of the child in acquiring the shared meanings of words have been neglected. We considered it important to study in detail the interactive processes by which the first meanings emerge, and also the child's actions in learning language.

According to Bruner (1975), the first referential meanings of words arise from the pre-verbal interaction between the parent and the child; non-verbal interactions are seen to "scaffold" the child's early language development (see also Bates, Camaioni & Volterra 1975; Ninio & Bruner 1978; Bruner 1983). In particular, joint visual attention of the child and parent to physical objects is seen as a pre-requisite for learning to name objects (Tomasello & Farrar 1986; Kidwell & Zimmerman 2007). According to this view, the child first learns to focus her attention on the same referent as her parent, which the parent then names. Shared focus of attention by parents and their children contributes to the establishment of

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object reference: children follow their parents' head orientation and eye gaze, and on the other hand the parents look at the things their children attend to (Bruner 1983: 70–77). Joint attention, or visual co-orientation, is thus a form of primary intersubjectivity (Trevarthen 1979) – a primitive form of shared understanding between the interlocutors. On this basis children later develop a higher level, secondary intersubjectivity, that involves a shared understanding of the signs of language, such as spoken words (Trevarthen & Hubley 1978).

At the age of 12 months, children typically produce the first articulated word-like structures, proto-words (Kent & Bauer 1985; Vihman & Miller 1988). Proto-words usually consist of one articulatory movement, such as the closure of the airway with the tongue, during phonation (Menn 1983). The proto-word does not yet have a referential linguistic meaning. However, it has been found that even before the onset of speech, a child may use proto-word, the only segmental phoneme construction s/he can produce, as a holophrase, often with diverse intonation contours, to express various needs and feelings (Dore 1975). In our view, proto-words interestingly precede the first recognizable attempts at words and are already recognized and treated by the parents as speech-like structures.

At the age of 12 months, children also make use of pointing hand gestures when communicating with others (Wootton 1994; Liszkowski 2005). In fact, pointing is one of the very first communicative devices that children acquire between 9 and 12 months (Butterworth 2003). Some studies have linked referential communication with pointing gestures to language acquisition. However, these studies have focused on the quantitative and correlational aspects showing, inter alia, that the amount of pointing gestures at 12 months predict the amount of words at 20 months (Camaioni, Caselli, Longobardi & Volterra 1991). The co-occurrence of gestures and vocal expressions has also been noted (see, e.g., Jones & Zimmerman 2003, on "blurred vocalizations" combined with gestures). However, prior studies have not analyzed the interactive sequential organization of pointing actions, vocalizations and parents' responses.

Two research questions emerge: first, how does the child actually shift from non-verbal communication to speaking and to the higher secondary level of intersubjectivity? Secondly, how are the interactions involving joint attention between a one-year-old child and the parent structured

sequentially? These are the questions we will answer in more detail in this article.

2. Method

2.1 Aim of the study

The purpose of the study is to examine the sequential interactive construction of activities that one-year-old children initiate using gazing, proto-word expressions and pointing gestures. Both the child's initiative action as well as the parental response are examined. More specifically, we will analyze the grammatical structure of parental responses and the sequential structure of child-parent interaction in order to consider their role in the acquisition of language and its social use.

2.2 Data

The data for the study comes from the "Child's developing language and interaction" project (PI: Minna Laakso) and its Helsinki Child Language Longitudinal Corpus, where typically[2] developing Finnish-speaking children were followed from the age of ten months until five years. Families took part in the research project voluntarily and written consent for participation was obtained from the parents. The children were videotaped at their homes in dyadic interactions with the parent for about half an hour at a time. A cameraman was present during the videotaping, but did not take part in the interaction. For this study we analyzed the tapes from four children: three girls (Helmi, Nuppu and Vilma) and one boy (Juha).[3] In this article, Nuppu's data will be discussed in more detail in the examples (see 3.2.), while data from all four children appear in the tables (see 3.1.). We examined the tapes recorded of each child around the age of one, before the emergence of the first recognizable words (see Table 1).

[2] The normal development of the children was evaluated using normative language testing. Tests included Finnish versions of the Reynell Developmental Language Scales II (Reynell & Huntley 1987) and Symbolic Play Test (Lowe & Costello 1988).

[3] Pseudonyms are used in referring to individual participants in any reporting of this study.

Table 1. The age of children at the analyzed recordings

Child	Age at recordings (years; months. days)					Σ
Vilma	0;9.27	0;10.24	0;11.22	1;0.26		4
Helmi	0;11.3	1;0.0	1;1.5	1;2.2	1;3.3	5
Juha	0;10.22	1;11.20	1;0.16	1;1.17	1;2.8	5
Nuppu	0;11.8 1;0.23	0;11.24 1;0.29	1;0.0 1;1.3	1;0.9 1;1.13	1;0.16	9

The data is comprised of 23 recordings of parent-child interaction before the onset of the first words,[4] totaling about 12 hours. As the first words emerged from the children at different rates and the recordings began at slightly different times between the ages 0;9 and 0;11, the number of tapes from each child differs: from Vilma four, Helmi five, Juha five, and Nuppu nine.

2.3 Analysis of child-parent interaction

The analysis focused on the children's use of gazing, proto-words and pointing in initiating a sequential activity. First, the co-occurrences of these phenomena were searched for in the data base. Second, the interactive sequences initiated by the use of proto-word expressions were transcribed and studied using the principles of ethnomethodological conversation analysis (CA), (e.g. Goodwin & Heritage 1990). CA was found useful for the study of child-parent interaction as it looks at the turn-by-turn

[4] The first meaningful words produced by the children were identified following a procedure devised by Vihman and McCune (1994). The criteria are based on both formal (phonetic) and functional considerations, such as the degree of segmental match with the adult target, use in a clearly determinative context, and identification by the parent. Each word candidate was rated for the presence or absence of each type of evidence (see Vihman & McCune 1994).

sequential properties[5] of interaction and goes beyond categorical classification of individual elements. Applying the principles of CA, the proto-word utterances were analyzed within their local sequential environment in the ongoing interaction between the child and the parent. As well as spoken utterances, we also considered gestures, gaze, and head orientation of both the child and the parent during proto-word sequences. Furthermore, we analyzed the linguistic structure of the responses the parents gave to their children's utterances.

The child's proto-words were transcribed using the International Phonetic Alphabet (IPA) and the interaction using CA transcription conventions (see Appendix 1). The transcript of speech consists of three lines: the original utterance in Finnish, a word-by-word gloss, and a free translation into English (see Appendix 2 for glossing symbols). The speaker's own non-verbal gesturing is marked below the transcript of speech. However, if non-verbal gesture functions as an independent act in the interaction (i.e., without speech), it is described on a line of its own in the transcript. When relevant to the analysis of visual orientation towards the objects pointed at, the speaker's gaze is marked with a continuous line above the spoken utterance showing the duration of gazing (see Goodwin 1981: 52). The recipient's gaze, showing her co-orientation towards an object, is marked with a continuous line on a line of its own below the current speaker's utterance. Square brackets show the beginning and the end of simultaneous actions, either verbal or nonverbal, of different participants.

3. Proto-words and pointing gestures in child-parent interaction

3.1 Frequencies of pointing gestures by the children studied

All the children studied used pointing gestures to initiate interaction sequences with their parents (see Table 2). Children's gestures were mostly accompanied by proto-words or other vocalizations.

[5] CA is a qualitative research approach that analyzes how interaction is constructed as a collaborative activity by the participants. The basic phenomena that are studied in interaction are the construction of turns and actions, turn-taking, sequential organization of activities, and repairs of problems in intersubjective understanding (see, e.g., Schegloff 2007).

Table 2. The frequencies of pointing gestures in the analyzed recordings

Child	Occurrences of pointing gestures in recordings					Σ
Vilma	0	2	16	4		22
Helmi	3	17	22	24	45	111
Juha	6	3	4	14	12	39
Nuppu	28	9	16	7	17	
	72	25	14	3		191

The number of pointing gestures varied from tape to tape, although they were quite frequent in all children at and around the age of one year. The activities the parent and child were engaged in may have affected the frequency: many of the pointing gestures occurred during feeding when the child was sitting in a high chair and most objects in the physical environment were out of reach. Another context where the child often initiated pointing was picture book reading. The third common activity in the tapes, that of examining toys or other objects, involved less pointing; it occurred only when the child momentarily shifted her/his attention from nearby toys to the wider physical surroundings and pointed at a more distant object. Nuppu and Helmi used pointing gestures most frequently, Vilma and Juha less often. Nuppu also most consistently combined the pointing gesture with one single and salient proto-word [ættæ]; the other children combined gestures with less stable proto-words (e.g., [tææ], [tøø]) and other vocalizations. Due to the late emergence of first words, Nuppu was taped more frequently than the other children during this period, and thus there is an extensive collection of proto-word utterances from her. In what follows, we will inspect the interactive sequences that are initiated by proto-words using extracts from Nuppu's data at 12 months as examples of the whole corpus.

3.2 Interactive use of proto-words and pointing gestures by one-year-old children

On the basis of our analysis we found that the children's proto-word utterances were interpreted by the parents as referring to multiple referents and as performing various conversational activities. Although the proto-word remained approximately the same in all these utterances, the context and the accompanying non-verbal activities varied, which appeared to induce different parental interpretations. To show the interactive construction of proto-word sequences in more detail, we present here four extracts from the interaction between Nuppu (age 1;0) and her mother. The extracts come from the videotaping of a mealtime in the kitchen, where Nuppu is sitting in her high chair and her mother is feeding her porridge.

Nuppu has only one proto-word in her vocabulary, namely [ættæ] (the vowel quality of the production sometimes varying a bit, resulting in [ætti]). Although Nuppu's proto-word does not have any fixed referential meaning, it structurally resembles the first words of children learning Finnish. Finnish children's early words more often fall into a geminate[6] template, (C)VCCV, with the initial consonant only an optional segment (Savinainen-Makkonen 2000, 2007), whereas in English, first words are usually structured as CVCV (Ingram 1999). In Finnish, the geminate structure seems to be overrepresented in child-directed speech and even more so in child forms of Finnish words.[7]

Our main observation was that Nuppu actively used her proto-word [ættæ]/[ætti] to initiate conversational sequences. Furthermore, she was encouraged to continue this, as she repeatedly received an interpretative response from her mother, a response that was structured as a candidate understanding of the meaning of Nuppu's proto-word and gesture combination. Within CA, a candidate understanding is defined as a device

[6] Consonants have two phonological lengths in Finnish: short (single) and long (geminate). The quantity of the sound changes the meaning of the words (e.g. [kuka] 'who' vs. [kukka] 'flower').

[7] In Vihman's and Velleman's (2000) study dealing with Finnish children more than 50% of children's early words had a geminate structure. In Savinainen-Makkonen's (2007) case study the proportion was even bigger: of Joel's 50 first word forms 74% had a geminate structure.

that the recipients of talk use to articulate a tentative reading of a previous turn (cf. Schegloff, Jefferson & Sacks 1977; Ochs 1988). Here Nuppu's mother's candidate understandings display that she interpreted Nuppu's initiations to perform (at least) two kinds of actions: naming and requesting. The first two extracts presented below are naming sequences, and the last two, request sequences (although the latter request sequence is not clearly treated as a request by the mother).

Naming sequences: Extracts 1 & 2

In Extract 1, Nuppu initiates a naming sequence typical of the whole data corpus. The sequence is initiated in line 2 where Nuppu turns towards the camera and points at it. Nuppu's multi-modal action consists of both gazing and pointing at the camera (or the person behind it) as well as the production of the proto-word. The gesture in line 2 can be seen in Picture 1.

Extract 1. Child's initiative action treated as a request for naming

01	M:	FEEDING N (5.0)	
02	N:	_____camera ↑[ætti], POINTS AT THE CAMERA	**proto-word + gaze + pointing gesture**
03		(2.0)	
04	M:	_____N *Nii.* (1.0) *Siel on tä↑ti,* PRT there is auntie 'Yeah. (1.0) There is an auntie.'	**response particle + pause + candidate understanding [LOC + V + N]**
05		(0.8) N CONTINUES TO LOOK AT THE CAMERA, M FEEDS HER	

M=mother; N=Nuppu; [LOC=locative; V=verb; N=noun].

Picture 1. Nuppu is pointing at the camera (see Extract 1, line 2)

Here the mother is verbalizing the referents that are within the focus of Nuppu's attention in the physical environment. However, it is Nuppu in line 2 who initiates this sequence by saying [ætti] and gazing and pointing towards the referent. Nuppu also uses a very high pitch thus marking the referent possibly as something new and worth mentioning (see, e.g., Vainio & Järvikivi 2006). The mother responds to this action first by acknowledging it with the response particle *nii* (appr. 'yeah'; cf. Sorjonen 2001) thus treating Nuppu's proto-word utterance as the first pair part of an interactive sequence. Then she provides a candidate understanding of the possible referent of Nuppu's proto-word expression (*siel on täti* 'there is an auntie', line 4). As is often the case in child-directed speech, the main NP occurs last in the utterance and is marked with a pitch raise (Cruttenden 1994). It is noteworthy that both the child's [ætti] (line 2) and mother's *täti* 'auntie' (end of line 4) are prosodically marked with a raise in pitch.

The caregiver's two-part response to the child's initiation is not only doing responding to the child. Both parts of the parental response are doing a specific action. Besides acknowledging, the first part, *nii*, also agrees and affiliates with the child's initiation displaying that the caregiver understands the child and what the child is pointing at. In the second part, candidate understanding, the caregiver mentions the referent and thus takes

the sequential opportunity not only to affiliate with the child but also to teach language to her. The child conforms to this by not initiating repair (cf. later, in Extract 4, the child rejects mother's candidate and initiates repair).

The candidate understanding is structured as an existential construction with an initial locative element *siel* 'there', followed by a verb and a referring NP *täti* 'auntie.' It is interesting to note that the mother does not look at the "auntie" (the woman operating the camera) but rather at the child. We could argue that while acknowledging the child's attempt to bring in a new referent, the mother does not shift her attentional focus to that referent. This is reflected not only in her gaze direction but also in the linguistic form, the existential construction: it has been shown that even though the existential construction functions to bring new referents into discourse in Finnish, these referents tend not to be further tracked in subsequent discourse; i.e., they do not become topics in the interaction (Helasvuo 1996). We may also note that the referring element (*täti* 'auntie') is a bare noun phrase with no modifiers. This means that in the referring NP there is no element that would function to direct the interaction in a certain way. For example, there is no element that would indicate that the referent should remain within the focus of subsequent talk (cf. Helasvuo 2001: 99–100). Thus, the linguistic form of the candidate understanding is designed so that it directs the interaction and projects no further talk on the referent mentioned.

In Extract 2, Nuppu has shifted her gaze towards the window (line 8). She then produces the proto-word [ættæ] while simultaneously looking and pointing towards the window (line 9). Here again the mother responds to this with the particle *niih* (appr. 'yeah') and with a candidate understanding (line 11). There are two butterflies hanging in the window for decoration. In the transcript, the butterflies are marked b1 (the butterfly closest to the camera) and b2 (the butterfly closest to the mother). Pictures 2a and 2b show Nuppu's pointing gestures towards the butterflies.

Extract 2. Child's initiative action treated as a request for naming

07	M:	[*Vähä häikäsee.*
		[a.little glares
		['(The sun) glares a bit.'

[
[
08 N: [NUPPU IS LOOKING AT THE WINDOW

____window
09 N: [ættæ],
NUPPU POINTS AT B1

proto-word + gaze + pointing gesture

10 N: ____shifts gaze to b2
(1.5)
NUPPU POINTS AT B2

___b1,,, ____ b2
11 M: [*Niih.* (.) *Ne on ne* ↑*perhoset* °*siellä ikkunassa.*°
[PRT they are those butterflies there window+INE
[‘Yeah.(.) They are those ↑butterflies °there in the window.°’
[MOTHER POINTS AT THE BUTTERFLIES
[
[
[
[

response particle + pause + candidate understanding
[PRON + COP + [MOD + N] + LOC]

12 N: [LOOKING AT THE WINDOW

13 (11.0) M CONTINUES FEEDING N

M=mother; N=Nuppu; b1=butterfly 1; b2=butterfly 2;
[PRON=pronoun; N=noun; MOD=modifier; COP=copular verb; LOC=locative].

Picture 2a. Nuppu is pointing towards butterfly 1 in the window (Extract 2, line 9)

Picture 2b. Nuppu is pointing towards butterfly 2 in the window and mother is shifting her gaze towards the butterflies and points at them (Extract 2, line 11)

In line 8, Nuppu is looking at the window, and in line 9 she points at a referent in the window, namely the butterfly which is closest to the camera (and furthest away from the mother) and simultaneously produces the proto-word [ættæ] (line 9, see Picture 2a). After the proto-word Nuppu continues looking at the window and silently shifts her gaze and point towards the butterfly that is closest to her mother (see Picture 2b). When producing her response in line 11, the mother gazes in the same direction where Nuppu is gazing, and thus, joint attention on the same object is achieved. With her double pointing and shifting gaze, Nuppu has picked multiple referents, namely, the butterflies. While producing her response (line 11), the mother scans the butterflies in the same order as Nuppu did just a moment earlier, starting from the butterfly closest to the camera and ending with the one closest to herself (see Picture 2b).

Similar to Extract 1, the mother first produces a response particle *niih* ('yeah') and then a candidate understanding displaying both her understanding of the child's referring expression as well as verbalizing it in order to model language to the child. Furthermore, similar to Extract 1, the mother also again marks the named referent (butterflies) with a pitch raise as something to be noticed.

The candidate is structured as a predicate nominal clause *ne on ne perhoset siellä ikkunassa* 'They are those butterflies there in the window' where the predicating NP is formed as Modifier + Head (line 11). The mother uses the modifier *ne* 'those' which conveys that the referent is adequately identified for the purposes at hand, and, furthermore, that it needs no further discussion (Laury 1997, Etelämäki 2005: 19–20). By using a plural form, she acknowledges the multiplicity of the referents Nuppu has brought to her attention by non-verbal means. In her utterance the mother names the referents with the noun phrase *ne perhoset* 'those butterflies' and then states the location in a silent voice. This is done using a locative phrase *siellä ikkunassa* 'there in the window'.

In sum, child-initiated naming sequences consist of two parts. First, there is the initiative action by the child, and second, the candidate interpretation provided by the parent. Usually there are no third parts, such as the child's acknowledgement of the interpretation, in these sequences, but children conform to their caregivers' responses by not initiating repair. Furthermore, although the parent names the referent of the child's pointing gesture, the referent does not become a topic of their subsequent

interaction. We have shown that the choice of the syntactic construction where the naming of the referent is embedded serves to guide the further course of the interaction, including further talk regarding the referent. In the following request sequences, the opposite is the case.

Request sequences: Extracts 3 & 4

In Extract 3, the mother treats Nuppu's proto-word utterance as a request. Nuppu produces the proto-word [ættæ] and turns and reaches her pointing hand towards the kitchen sink (line 31). The mother provides the possible referent *vettä* 'water'[8] (line 33) which Nuppu may be aiming at. Nuppu sustains her twisted body posture until line 36 and then turns back to the table when her mother stands up and goes to the sink to get water. Nuppu's reaching body posture in line 31 can be seen in Picture 3b. However, as she has turned her back to the camera, her pointing hand is not seen in the picture.

Extract 3. Child's initiative action treated as a request

30 M:	*Otaksä*	*vielä*	*vähän.*
	take+Q+you	still	a.little
	'Do you still take some.'		
	M OFFERS N A SPOONFUL OF PORRIDGE		
	_____sink		**proto-word + gaze + turning**
31 N:	° [ættæ].°	*(1.0) [ættæ].	
	*REJECTS SPOON AND TURNS TO THE SINK WITH A POINTING HAND	*MAINTAINS HER POSTURE AS TURNED TOWARDS THE SINK	

[8] Nuppu's proto-word [ettæ] later in the sequence (line 38) comes already close to the Finnish word /vettæ/ (*vettä*), which means water and what the mother offered as the candidate to Nuppu in line 33.

32		(0.8)	N MAINTAINS HER POSTURE AS TURNED TOWARDS THE SINK
33	M:	↑*Vettä.* water+PAR 'Water.'	**candidate understanding [N]**
34		(2.5)	**+ pause**
35	M:	*Siel on nokkamuki.* there is sippy cup 'There is your sippy cup.'	**+ elaboration (lines 33–35)**
36		(15.0)	N TURNS BACK TO THE TABLE WHEN M STANDS UP TO GET THE WATER FROM THE SINK
37		(15.0)	N DRINKS FROM THE CUP
38	N:	[ettæ]. (water)	

M=mother; N=Nuppu; [N=noun].

Picture 3a. Nuppu refuses to take the food offered (Extract 3, line 31)

Picture 3b. Nuppu turns towards the kitchen sink (Extract 3, line 31)

In more detail, this interaction can be analyzed as follows. The mother is offering a spoonful of porridge to Nuppu (line 30). She verbalizes the offer with a question *otaksä vielä vähän* 'do you still take some'. In her response (line 31) Nuppu is combining two actions: first, she rejects the offer (see Picture 3a), and second, initiates her alternative action for eating by turning and pointing towards the sink (see Picture 3b). Both actions are accompanied by proto-words. While producing the first proto-word, Nuppu starts to turn her body towards the kitchen sink, located behind her. She then produces the proto-word again more loudly and maintains her twisted body posture towards the sink. The silent voice quality of the first proto-word may have something to do with the act of refusing to take the food offered.

The caregiver does respond immediately to Nuppu's initiative action that offers an alternative to what the mother had been doing (feeding porridge). Furthermore, the caregiver's response is very simple. After a pause (line 32), the mother verbalizes Nuppu's request as *vettä* '(some) water' (line 33). Structurally, the turn is formed by a bare noun phrase, a mass noun which is inflected in the partitive case indicating unbound quantity. As such, it indicates the fact that there is water (available) at the sink. At the same time, however, the turn (line 33) is formed so that it is

morpho-syntactically fitted to the previous offer by the mother in line 30. In the offer, the object NP is ellipted in the Finnish original; it can be inferred from the context (porridge). The mother's turn on line 33 adds the missing object NP to the question (*otaksä vielä vähän + vettä* 'do you still take some + water').

We may further note that the NP *vettä* is also marked with a very high pitch that has a questioning quality. Thus the mother is treating Nuppu's initiation as a potential request for water and asks for Nuppu's confirmation for her candidate understanding. As Nuppu maintains her position turned towards the sink, the mother elaborates on this theme ('there is your sippy cup', line 35) and finally carries out the request (line 36). When the mother stands up to go to the sink, Nuppu turns back to the table and thus conforms to the caregiver's action.

After the caregiver has given her water in the sippy cup, the child produces something that could be an early attempt to imitate the mother's speech (note the change of vowel quality in the proto-word [ettæ] in line 38). If so, it could be one of the first occurrences of a third position turn showing verbal acceptance of the candidate understanding (and the action of giving water to her) by repeating the target noun *vettä* (water). It also is one of the first signs of the process of learning the pronunciation of the word. In fact, *vettä* was among the first fifteen words that Nuppu had in her productive vocabulary. It is also of interest to note that the children used this kind of repetitive imitations later, when they were approaching two years of age, to acknowledge adults' corrections and improve their pronunciation (Laakso 2010).

In Extract 4, the referent *kukka* 'flower' has been talked about before and Nuppu has tried to reach for it several times. In line 107, Nuppu produces the proto-word, gazes and points at the flower, and stretches out to point at it. At the same time, she also leans her body towards the flower. However, the mother treats Nuppu's proto-word simply as naming a referent (line 108). Nuppu's response (lines 110 and 113) reveals that she is not satisfied with this interpretation, and she displays this by crying. Nuppu's crying can be seen as a third position repair that rejects the candidate offered by the mother as not adequate (see also Wootton 1994, for observations of early third position repair). There seems to be some disagreement about the ongoing activity, requesting vs. naming. Nuppu's pointing gesture is seen in Picture 4.

Extract 4. Child's request treated as naming

106 (2.5)

____flower
107 N: ↑[ættæ],((stressed production)) **proto-word + gaze + pointing gesture**
POINTS AT THE FLOWER AND STRETCHES OUT TO REACH FOR IT

____N
108 M: *Kukka?* **candidate understanding [N]**
flower
'Flower?'

109 (2.0) N STOPS POINTING WHEN M HAS PRODUCED CANDIDATE

____looks down
110 N: *(K)hhbb*[*hybhybhy.* ((cries))
[
111 [M OFFERS N HER SPOON

112 M: *Mmm*[*:h.*
[
113 N: [*(k)bbhybhybhy,* ((cries))

114 M: *Tossa lusikka.* (1.0) *Ai niin meijän piti ottaa noi* (.)
there spoon PRT PRT we+GEN should take those
'There (is) spoon. (1.0) Oh yeah, we should take those
M STANDS UP, GOES TO GET THE VITAMINS

115 *vitamii°nitipat.°*
vitamin-drops
vitamins.'

M=mother; N=Nuppu; [N=noun].

Picture 4. Nuppu is pointing at a flower on the table (Extract 4, line 107)

Extract 4 stands in contrast with the previous examples in several ways. First, the mother and the child do not have a shared focus of attention: while the child is looking at the flower and trying to reach it, the mother is gazing only at the child. Secondly, the mother's utterance in line 108 is structured as a bare NP not fitted to any clausal construction. (It is a so-called free NP; Helasvuo 2001.) Thirdly, its prosody does not mirror in any way the highly prominent production of the child in line 107. Fourthly, the mother quickly moves on by first offering the spoon (line 111) and then initiating another activity, taking the vitamins (lines 114–115). It is obvious that here the child and the mother have different agendas: the child is not only shifting her attention towards the referent but is also making a request in order to get it, while the candidate understanding by the mother simply states the name of the referent. It is interesting to note that after the mother has produced the candidate, the child immediately stops pointing (line 109), and, as a reaction to the mother's bare naming response, she also starts to cry (line 110). So she displays her dissatisfaction with her mother's actions and tries to repair the course of action her mother has chosen. Similarly, in line 111, as the mother offers Nuppu the spoon (instead of the flower Nuppu has been interested in), Nuppu reacts by crying. Thus in

extract 4, the child displays initiative requesting but the mother does not adapt to it. Most importantly, Nuppu's rejections of her mother's candidate interpretations (as in Extract 4) (and also confirmations as in Extract 3) in the third turn clearly make the negotiation of intersubjective understanding between the interlocutors visible. Thus, in Extracts 3 and 4 emerge the first interactive three-part-sequences with child's request, caregiver's response, and child's acceptance/rejection.

4. Conclusions and discussion

In the present article we focussed on parent-child interaction when parent and child are working out the meanings of the child's proto-word utterances. In particular, we studied interactive sequences which the child initiates by using a multi-modal expression (a combination of a proto-word, gazing at a referent, and a pointing hand gesture). Despite having limited skill in articulating more than a proto-word, i.e. a word-like structure with no actual linguistic meaning, with the interpretive help of the parent the children were actually able to perform quite complex activities of requesting both the names of objects and the referents themselves. Furthermore, as the caregivers respond to the children's proto-word expressions with names and by conducting some actions, during the course of these interactive proto-word sequences the children start to learn the linguistic signs/names of different referents. Thus, through this sequential work the child can acquire the meanings (and forms) of the shared signs of language.

In contrast to previous studies stressing the input of the parent in language acquisition (e.g. Snow 1995; Clark 2003) it is notable that in our data for one-year-olds, it is most often the children who actively initiate the interaction, by using proto-words and pointing gestures. In the sequences initiated by the children's proto-word expressions, the parents respond by either naming the referent or by providing more elaborate interpretation about the nature of the child's action. The responses of the parent also provide a model of adult production of the words and meanings the child is trying to express using proto-words and pointing gestures. Thus the responses provide referentially grounded models for the child's first words. The first sign of the proto-word changing into a recognizable word is seen in Extract 3, where, after mother's model, the child produces her proto-

word in an altered form [ettæ] which comes already close to the Finnish word /vettæ/.

Along with the shared meanings of words, we see the parents' responsive interpretations as a means to carry over the meanings of different social activities to their children. The parents' responses may take various grammatical forms: just a bare noun phrase with no determiners or modifiers as in Extracts 3 and 4, a response particle followed by an existential clause as in Extract 1, or a predicate nominal clause as in Extract 2. These grammatical forms serve different interactional functions: the bare noun phrase deals primarily with reference, while the more elaborate constructions offer a certain perspective or stance towards the referent (e.g. that the referent is identifiable as in Extract 2 or that the referent should not form the focus of attention and further talk as in Extracts 1 and 2). The bare noun phrase response can, however, display different activities depending on the actions the mother combines it with. If the mother produces the NP and simultaneously offers the child the corresponding item (such as water in Extract 3), the child's initiative action gets displayed as a request for something, whereas if the mother provides the NP but moves on to other activities (Extract 4), the child's initiative action gets interpreted as a simple naming request (but the child rejects this interpretation by crying).

Our linguistic analysis thus aimed to show that the acquisition of language and linguistic forms is embedded in social interaction. The meanings of words are learnt as embedded in larger syntactic constructions which serve to direct the interaction in certain ways and make projections about the subsequent course of the interaction. We hope to contribute to linguistic research by studying gesture and embodiment as they are used together with language. Within the field of language acquisition studies our study emphasizes the role of embodied action in the acquisition of linguistic forms.

We have further shown through a close analysis of the interactive sequences in their local contexts how the meanings of objects and the actions they imply are negotiated in interaction between the parent and the child. This negotiation may be smooth as in Extracts 1, 2 and 3, or it may result in child's rejection of the candidate meaning the parent is offering (as in Extract 4). Also under negotiation is the kind of activity that the participants are engaged in and are co-producing in interaction. This was exemplified by Extracts 3 and 4. In Extract 3 the mother's activity was

offering food to Nuppu, whereas Nuppu reached for her sippy cup. As a result, the mother offered her water in the cup. In Extract 4 the mother was naming a referent that Nuppu was reaching for, and mother did not change her response although Nuppu reacted to it by crying. Instead, the mother tried to shift Nuppu's attention to other things by offering her a spoon. More generally the children's pointing and proto-word expressions, and the working out of their reference, are embedded within larger sequential structures, where the children make their initiations also to restructure on-going sequences and to alter the course of the projected parental actions.

According to Trevarthen and Hubley (1978), joint attention is a prerequisite for primary intersubjectivity. Our findings confirm previous studies' observations that shared attentional focus is indeed a recurring element in child-parent interactions (e.g., Bateson 1979; Tomasello & Farrar 1986; Kidwell & Zimmerman 2007). Similarly, our study supports the suggestion of Jones and Zimmerman (2003: 178) that a child's pointing gesture and the response by the caregiver could form a conversational "proto-adjacency pair". In addition to these prior findings, we have shown that attentional shifts (with gaze and pointing hand gestures) are combined with the child's proto-word utterances; i.e., these non-verbal elements accompany the child's first attempts at articulated speech. We believe that proto-words are very integral parts of these expressions and enhance parental responsiveness. As the parents interpret these first attempts, they provide a model of the target words that the children can then imitate and learn (an early display of that was seen in Extract 3 where after the mother's response, Nuppu articulated her proto-word in a manner similar to the mother's speech). The multi-modal proto-word utterances thus serve as a transition phase towards the first referential words and also towards worded speech activities, such as the formulation of requests.

With multi-modal proto-word utterances the child actively initiates conversation-like sequences. Furthermore, it is through these child-initiated sequences that the meanings of referring expressions are being negotiated. Thus, in contrast with many previous studies emphasizing adult initiation (e.g., Estigarribia & Clark 2007) and input (e.g., Snow 1995), we have shown how the child can direct the course of the interaction and her own language learning through initiative actions. Through the sequential construction of interaction that follows these initiative actions, the children acquire shared understanding of social activities and the signs of language;

in other words, they develop a higher level of intersubjectivity. The present study suggests that there is an embodied interactive origin of language: adults who scaffold infants' earliest communicative intentions promote children's abilities to communicate and learn language. However, more in-depth follow-up studies of children's early interactions are still needed to show the connections between sequential parental interpretations and the emergence of first words.

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Appendix 1. Transcription symbols

The notation used is basically the same as that used in conversation analysis literature (see, e.g., Atkinson & Heritage 1984: ix–xvi). The notation of non-verbal actions (gestures) is added (cf. Laakso 1997: 12–14) as well as a simplified notation of gaze following Goodwin (1981: vii–viii).

Overlap and pauses

(0.5)	A pause and its duration in tenths of seconds
(.)	A micropause (less than 0.2 seconds)
[	Beginning of overlap
]	End of overlap

Intonation contour

.	A falling intonation
,	A continuing (level) intonation
?	A rising intonation

Prosodic shifts and speech volume

↑	The word/segment following the arrow is uttered in a higher pitch than the surrounding speech.
↓	The word/segment following the arrow is uttered in a lower pitch than the surrounding speech.
º ei º	A silently pronounced word or utterance.

Duration

la-	A cut-off word (a hyphen indicates self-interruption of the word)
la**:**	A stretch (a colon indicates lengthening of a sound)

Other

.joo	A word pronounced with inbreath
.hh	Inbreath (each h indicating one tenth of a second)
hh	Outbreath
(koira)	Single parentheses indicate transcriber's doubt
(-)	An unclearly heard word or utterance

Gestures and gaze

POINTS AT A DOLL	Non-verbal actions are described in capital letters on a separate line below the utterance they co-occur with, or on a line of their own if there is no simultaneous talk.
_____b [ættæ]	A line above the utterance indicates that the speaker is gazing at an object or person; here the b indicates that the child is looking at a butterfly.

Appendix 2. Principles and abbreviations used in glossing

In the gloss, morphemes have been separated with a plus sign (+).

COP	Copular verb
GEN	Genitive
INE	Inessive
LOC	Locative element
MOD	Modifier
N	Noun
PAR	Partitive
PRON	Pronoun
PRT	Particle
Q	Question clitic

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