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Children's language blossoms: From sensation to words

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In this paper, we will wander along a meandering pathway made of children's language blossoms and observe how sensations are shaped into words and linguistic constructions thanks to the parental input. The analysis of snippets of children's daily lives extracted from longitudinal data of mother-child recordings can give us a direct apprehension of how children's sensations and experiences are at the root of the language acquisition process in dialogue. Our observations of children's first steps into language can only increase our appreciation of the importance of their interactions with adults and older siblings in the development of their multimodal language skills. Even if children have innate biological and cognitive capacities, they need to learn social and linguistic conventions from the input. They construct these capacities in parallel with other cognitive and social skills, such as the ability to follow the others' gaze, to draw their attention, to read their intentions, to make analogies, to symbolize.

We will first present our theoretical framework and data. We will illustrate the importance of the role of the caregiver in shaping the link between sensations and language, and then give examples of how children learn to express their sensations with conventional semiotic expressions, in order to show how they construct their fully-fledged language skills out of daily experience shaped into repeated multimodal scripts, that they can internalize and share with others.

1. Theoretical framework and data

One approach to children's linguistic knowledge is to study longitudinal naturalistic recordings of individual children and analyze both the children's productions and the input they receive over a certain period of time. Child language research is one of the first fields in which spontaneous conversation data was systematically collected, initially through diary studies (Ingram 1989; Morgenstern 2009), and later by audio and video recordings shared worldwide thanks to the CHILDES project (MacWhinney 2000). Corpora from various languages therefore form the backbone for a large number of investigations in the field. In

this study, we will use examples from the *Paris corpus* (Morgenstern & Parisse 2012) made of seven longitudinal datasets of children filmed for 3 to 7 years one hour a month. The children examined here are Ellie, a British girl, Naima, an American girl, Madeleine, a French girl, and Théophile, a French boy. They are raised by middle-class parents who have all graduated from university and live in large cities. Transcriptions are aligned to the video (<http://colaje.scicog.fr>).

Following Tomasello (2003), we assume that children initially learn concrete chunks of language, linguistic gestalts that can take different sizes and shapes, in dialogue. They then generalize across those various elements in order to assemble abstract constructions (Fillmore 1988; Goldberg 1995) in the process of creating new utterances. These linguistic constructions are units of language that contain multiple cross-modal elements used together for coherent communicative functions.

Children's productions are like evanescent sketches of adult language and can only be analyzed in their interactional context by taking into account shared knowledge, actions, manual gestures, facial expressions, body posture, head movements, all types of vocal productions, along with the recognizable words used by children (Morgenstern & Parisse 2007; Parisse & Morgenstern 2010). Research in language acquisition has therefore developed the tools, methods, and theoretical approaches to analyze children's multimodal productions in context as early as the second half of the 19th century, through scientists' diary observations of their own children, followed by audio and then video-recordings made by outside observers. The detailed longitudinal recordings of children's language anchored in their daily lives enable us to find the links between motor and psychological development, cognition, affectivity, and language.

Children can internalize the language to which they are exposed; and they can extract form-function pairings, use them with sensitivity to the pragmatic and dialogue context (Halliday 1967). But they also exploit the creative potential of language (Chomsky 1959), going beyond rote learning based on situations that are fixed in advance. Children are both lumpers, as they generalize observations into patterns, and splitters, as they analyze patterns based on item-specific knowledge. Their mastery of language is marked by how freely they combine constructions and produce utterances that are accepted and understood by their interlocutors in context through negotiation of meaning as part of the social practice of conversation (Gumperz & Levinson 1996).

2. The role of the caregiver

Vygotsky's theory of learning as socially co-constructed between collaborating partners within a cultural context (1934) gives a fundamental role to interaction in the cognitive and language development of children. Originally developed by Wood, Bruner & Ross (1976) in the context of first language acquisition, *scaffolding* is a metaphor that is based on the Vygotskian premise of learning as a socially constructed process.

Children's entry into language is therefore guided by the input and is also very much triggered by their eagerness to imitate their conversational partners (Gopnik, Meltzoff & Kuhl 1999). Children's first productions are permeated with imitation and replication of the constructions heard in the adult input. In order for them to actually learn linguistic constructions, be they sound patterns, gestures, words or multimodal constructions, children must repeat and manipulate the forms, play with them, at first often on their own, in monologic cooing and babbling that serves as a kind of laboratory to test a wide range of sounds and prosodic patterns, or gestural configurations and movements. They activate them in a productive manner in interactions focusing on average frequencies and producing syllables or gestural configurations that are closer to the adult system. It begins with dialogical babbling or conversational vocalizations (Trevorthen 1977), for example, during diaper changing, when it is not really clear who, between the parent and the child, imitates the other. It continues with routines (Bruner 1983) and conventional gestures that enter the child's repertoire around 10-11 months old either through everyday playful scripts or songs and nursery rhymes, such as "bye-bye" (waving hands), "peek-a-boo" (playfully hiding face with hands), "bravo" (clapping hands), "the itsy bitsy spider". All those gestures derive from the culture the children are brought up in and have very strong social and symbolic values.

If children take up and imitate the forms produced by their parents, parents also seize and take up the sounds and movements produced by their children, in order to endow them with as much meaning as possible, and shape them into a form that could be compatible with the adult communicative system.

One of the baby's daily experiences in our Western communities is bathing. A caregiver looks over the baby and socializes her into the bath-taking experience by feeling and sharing her pleasure to be in water and by wording out every possible sensation. In the following extract,

Théophile's mother is actually holding him in his bath and wording the sensation she is interpreting from his facial expressions and laughter.

Example 1. Théophile, 7 months old

Théophile is bathing in a small plastic bathtub. He has a huge smile on his face and is giggling. His mother is holding him firmly and smiling at him.

Mother: C'est bon ça hein? C'est bon ça! (That feels good doesn't it? That feels good!).

When giving a bath, a parent whose experience with water has been fun, whose control ensures that the baby is safely held and not in danger, whose knowledge about the sensation of the water with its right temperature provides confidence, expects the baby to enjoy the bath and its various elements. The parent can manipulate the meaning of the bath and its sensation for the child and set up a sequence of experiential histories that will provide a background for the subsequent bath experiences. Verbal and gestural expressions convey a meaning that will come to be shared. Even though their experience of baths in their youth and throughout their lives may be quite different, because in the same moment, they share attention to the same elements, which is according to Tomasello a unique human property, both participants experience together some of the core aspects of the event.

In this extract, language is an essential tool used by the mother to go beyond joint attention, and share meaning. The utterance "c'est bon ça" makes sense of the child's sensation and transforms it into a communal experience. It is through the repetition of the scene associated to the words that it becomes a script and that the words are transformed into meaning.

Sensations are shared from the very beginning of life by babies and their caregivers, who can express them in conventional semiotic expressions that they thus transmit. In the next excerpt, Madeleine is "smelling" flowers in her own way as observed by the adult participants.

Example 2. Madeleine. 1 year and 1 month.

Madeleine, held by her mother, is standing outside over a pot full of flowers and is both smelling and feeling a flower with her mouth (a petal is in her mouth).

Observer: Tu manges les fleurs Madeleine? (Are you eating the flowers Madeleine?)

Mother: Mais en fait elle les mange pas. (In fact, she does not eat them).

Observer: Tu les sens avec la bouche. (You smell/feel them with your mouth).

Mother: Elle les sent avec le nez et la bouche (She smells/feels them with her nose and her mouth).

Mother walks away in the garden with her daughter in her arms. Madeleine leans towards the flowers within her reach. Her mother helps her lean closer.

Mother: Celles-ci je pense qu'elles ne sentent pas grand chose. On peut essayer. (I don't think these smell much. We can try.)

The mother smells the flowers.

Mother: Ca sent pas grand chose (They don't smell much).

Madeleine then smells the same flowers again.

Mother: It's not very interesting.

Mother and child are sharing sensations together, the mother actually takes the child's place, she smells the second flower just after her in order to create a community of sensations with her daughter. This is the basis of the building of "transcendental intersubjectivity" as Husserl would call it, the condition for a shared objective world and for some interdependence between those two specific individuals¹.

Personal experiences and the subsequent memories they create result from the encounter of the children with the environment, involving perception through smell, touch, taste and then action and interaction via communication. Here the child's sensations and experience is entirely social because the adults spend considerable efforts to discern what the infant is feeling and thinking. But the child's experience still remains private, and adults can only make interpretations based on their own experience.

Before a desire or its realization is expressed through words, in our Western culture where reading intentions is at the core of our social lives, children's thoughts and intentions are interpreted by their caregivers

¹ Through the lens of Duranti's entry on Husserl in the Sage encyclopedia (Duranti, 2010).

through the mediation of their actions, their facial expressions, their prosody, their gestures.

Example 3. Ellie 1 year and 5 months

Ellie is playing with her pushcart on which her teddy bear is sitting. She stops it.

Ellie: Teddie, Teddie.

Her voice has a very affectionate tone. She starts walking towards the teddy bear and her lips are forming the shape of a kiss. Two steps before she reaches Teddy, her grandmother interprets her action.

Grandmother: Give Teddy a kiss.

Ellie kisses Teddy almost simultaneously to the last words.

Grandmother: Oh that's a good girl!

This type of scene is quite extraordinary to watch, for the child's stream of thought and her intention are visible on her face and her body as she moves towards her teddy bear. The grandmother is able to word out that intention because Ellie's behavior and its target are highly predictable thanks to their shared experience and to their common socio-cultural code. Her intention is recognized because it conforms to the expectable intention in that context (Duranti, 2015). We could say following Gibson (1986) that the context, the child's body movement and the preparation of her lips create the *affordance* that makes the grandmother's interpretation possible and feasible. The grandmother's explicit interpretation of the child's behavior grounds her actions into their shared physical and mental space. Language is used to express the child's intention and therefore plays an important socializing role (Ochs 1988).

Ellie's mother and grandmother are constantly trying to enter Ellie's consciousness and to project themselves into her first-person experience as she is thinking, perceiving, feeling. Our children are probably the best recipients of the illusion of complete empathy in the sense given to the notion by Theodor Lipps (1907) as the recognition of emotions expressed in bodily gestures or facial expressions and the primary basis for recognizing the other as a creature with a mind. Empathy in this context can indeed be understood as a phenomenon of "inner imitation," where the adult's mind mirrors the mental activities and experiences of the child based on the observation of her bodily activities and facial expressions. The adult might even experience (or

think she is experiencing) similar kinesthetic sensations as felt by the child and thus expresses them to her and for her with the help of the most magnificent of social arts, language.

3. From sensation to words: taking up, facial expressions and words

Children's understanding of novel entities is often mediated by their interlocutors' affective display, especially through facial expressions (Ekman 1984). This type of "social referencing" and the "affective frames" is fundamental to children's cognitive and linguistic development (Klinnert et al. 1983; Ochs & Schieffelin 1989). They will progressively take up those affective frames themselves. But it is quite difficult to tease apart what is spontaneous and what is socially learnt and internalized, such as in this example of Ellie's expression of disgust.

Example 4. Ellie, 2 years old.

Ellie's aunt is holding a bag of gummy bears. Ellie is distributing the candy around.

Ellie hold up a gummy bear to her mother

Ellie : Yellow.

Mother : Thank you Ellie.

Aunt: She's desperate to eat one.

Grand-mother: She's not desperate at all. She doesn't like them.

Aunt: She doesn't?

Grand-Mother: No

Ellie holds up a gummy bear to aunt's mouth. Aunt opens her mouth, Ellie puts it in the mouth.

Aunt: Hum thank you. And one for Ellie.

Ellie puts a gummy bear in her mouth.

Aunt: Thank you.

Ellie's smile is transformed into a disgusted expression. She takes the candy out of her mouth, looks at it with disgust. Everyone laughs. She then hands it over to her aunt who opens her mouth. Ellie drops it into her aunt's mouth. Everybody laughs.

Wittgenstein (1953) tries to show that sensations derive their identity only from a sharable practice of expression, reaction and use of

language. Without an external check of the description of our sensations, we would be unable to know that we have identified that sensation correctly. In this example, Ellie does not use language yet to express her disgust, but her facial expression is very easily recognized by the other participants who all laugh as it confirms the grandmother's assertion that Ellie does not like gummy bears. As Ochs and Schieffelin have explained in their pioneering paper "language has a heart" (1989), just as the expression of Ellie's disgust is mediated through her facial expression, it can of course be transmitted through words learnt in interaction such as the simple onomatopoeia "yuck", or more politely, "I don't like it". Little by little sensations are going to be expressed through words and the child is going to reproduce those words.

But children might express their sensations in different ways first because they are themselves individuals with their own cognitive, linguistic and affective development and because the input might be variable. So Madeleine might have never said "yuck" (or "beurk" in French) because we have no example of her parents or herself using such onomatopoeia. When something is good she says "c'est délicieux", where at the same age Théophile would say "miam miam" and other children might simply say "c'est bon" (it's good). Madeleine's mother reminds us of a Samoan mother as described by Elinor Ochs (1984), leading the child to a position symmetrical to the adult's, whereas in Théophile's family, the landmark is the child and the family enjoys his production of a multiplicity of onomatopoeia.

Children thus learn how to word their sensations in the triadic relation with their environment and the input. A child discovers a sensation such as the one provoked by heat for instance, by touching a series of hot objects, surfaces or tasting hot liquids or foods. This sensation is going to be verbalized by the adults in utterances such as "it's hot", and she will then associate it to what we call an adjective, *hot*. The sensation and its label *hot* can be associated to burning and thus the child might be warned against it as potential danger. But what is quite extraordinary is that we humans can operate displacements that children might also take up. Madeleine after discovering heat by touching and tasting her bottle, hot surfaces, hot soup, or wanting her bath water to be less hot and pouring cold water in it, can then even *pretend* that something is hot. In the following example, the sensation of heat is not felt through the body but the situation represented by a toy iron evokes it and the word is used as if the sensation had been felt. We are in what is commonly called "pretend play".

Example 5. Madeleine, 1 year and 4 months.

Madeleine is standing in front of her toy ironing board and toy iron. The doll's trousers are under the iron.

Mother : Mais il va brûler ton pantalon, ça va être une catastrophe là. (Your trousers are going to burn. It's going to be a disaster.)

Madeleine quickly touches the iron and retrieves her hand.

Observer: C'est chaud? (It's hot?)

Madeleine quickly touches the iron again.

Madeleine: Chaud. (hot)

Observer: C'est chaud en dessous. (It's hot underneath.)

Mother: C'est chaud?

Madeleine touches it again

Madeleine: Chaud ça. (Hot that).

Mother: Ouh c'est chaud! (oh yes it's hot!)

Madeleine, her mother and the observer are all "pretending" that the iron is hot. The word "chaud" therefore does not refer to actual heat Madeleine might feel when she touches the iron since it is not a real iron and is not hot, but to its fictional state in their act because Madeleine has experienced similar situations with a real iron or an oven or other hot surfaces. She can reenact the same gestures, facial expressions and words as during her own actual experiences of the sensation itself as well as her observation of her mother's.

When she is older, Madeleine develops a scientific approach to heat and she explains its effect on the snow that the children have scooped out of the courtyard and put in a bowl in the class.

Example 6. Madeleine, 3 years and 10 months.

Madeleine: Et après la sieste on a regardé. Elle avait fondu. (And after naptime, we had a look. It had melted).

Observer: Ca alors (Oh my).

Madeleine: Parce que dans la classe il faisait trop chaud (Because it was too hot in the classroom).

Madeleine makes large gestures with her arms representing the effect of the heat in the class and on the snow.

At the same age, thanks to her mother's questions, Ellie can talk about being warm and cold just by looking at a picture on a card and imagining, even embodying the sensations she would feel if she were actually in the scene.

Example 7. Ellie. 3 years and 10 months.

Ellie and her mother are looking at an illustration on a card.

Mother: That would be nice, do you think it's warm in that house?

Ellie: Cold.

Ellie wraps her arms around herself.

Mother: Why do you think it's cold?

Ellie: Cause it's blowy.

Ellie shivers.

Mother: oh you'd have to snuggle. But if you took lots of blankets in what would happen?

Ellie (whispering): we would get warm.

Ellie loosens her arms and makes herself comfortable on her mother's arm.

Mother: We would get warm that's right.

Ellie is enacting how her body would react by shivering and wrapping her arms around herself to fight off the cold that she is imagining. A drawing and the power of language are sufficient for her mother and her to share imagined sensations and live out the scene together.

4. From experience to constructions: taking up scripts

Children's cognitive and linguistic development centers on learning how to act and interact in the context of *events*, which serve as the basic unit of experience. That is, the continuous and dynamic flow of sensation, action and experience is structured in terms of discrete events, which involve various participants and props, temporal structure with a flow from beginning to end, and significant defining moments. It is the regularity and predictability of these events that allow children to master them as basic building blocks of experience; not only can they start recognizing typical and less typical examples of events, but they can gradually use them to make sense of much more complex sequences of

events, and eventually themselves learn to construct ever more sophisticated mental structures.

Language – a social phenomenon – is captured, internalized and reconstructed again and again by each individual child thanks to its transmission by care-givers in their daily interactions with their upbringing. As Nancy Budwig puts it, “Meaning comes about through praxis – in the everyday interactions between the child and significant others” (Budwig 2003, 108). Joint parent-child action/interaction provides the scaffold for children’s growing ability to grasp both what is happening around them, and what is being said in such a situation. They learn to understand language and action together, each providing support for the other. Duranti explains that language is “a mediating activity that organizes experience” (1984, 36) but of course, experience is conversely a mediating activity that organizes language. To examine how children come to use language in general, one must encompass the broader context in which the child experiences events and interaction. Following Goodwin (2000), our analysis of video extracts calls for the study of language development as typically embedded within interactions where embodiment and material culture (e.g. tools) play a crucial role as meaning-making resources.

In the following example borrowed from Morgenstern & Chang (2014), we are in a typical living room play scene and the tool in focus is simply a ball. There is a great amount of interaction and talk, but the child is not saying too much at this time as she is 13 months old. Still, we can see that she understands her mother. At least, as the following example illustrates, the mother infers that the child has the intention to first get the ball as she goes in the right direction, then she infers (or perhaps assigns) the intention of giving the ball to the father.

Example 8. Naima 1 year and 1 month

Naima and her parents are in the living room. The first ball they were playing with is out of reach.

Mother: Hey there’s the other ball !

Naima starts moving towards the ball.

Mother : Can you get it ?

Naima picks it up.

Mother : You got the ball.

Naima extends her arms with the ball.

Mother : Give Daddy the ball.

Child gives ball to father.

Father: hey, thank you.

At a high level, one can summarize this giving event in terms of the semantic roles traditionally associated with giving (and *give*-based constructions): the giver is the child, the recipient is the father and the theme (i.e., the item given) is the ball. But this description fails to capture the temporal flow of the scene. In this case, the giving event is marked and demarcated by three main stages during which the different participants are related in different ways:

The Mother INITIATES the *give* action with her utterance.

The child EXECUTES the *give* action (by physically bringing him the ball).

The father ACKNOWLEDGES the *give* action (with “thank you”).

Additional complexity here comes from the fact that there are multiple agents with multiple intentions and plans, all of which must be coordinated/negotiated in the situation, through a combination of language, gesture, action, etc.

We now turn to Naima’s more creative and more productive data. Looking at one of the first examples in Naima’s data, we see that she uses a *give* construction very early on, at 1;04.

Example 9. Naima, 1 year and 4 months.

The child is eating and she gives her mother a blueberry.

Naima: give Mommy

Mother: you're giving me this one? OK, thank you.

Naima: Naima give

Mother: Naima's giving it to Mommy

Naima: Naima

Blueberries

blu bl-Naima

bluies Naima

bluies Naima

Naima follows the general pattern that she uses at that age: a fixed pattern of two-word utterances. She only expresses the verb and the recipient “give Mommy” as she hands the blueberry to her mother. The verb *give* used without a subject is not an imperative in the situation and it is not a complete construction. It is most likely derived from the numerous situations when she has heard the directive speech acts “give Mommy” or “give Daddy”. She is replicating the script that is usually

produced as part of a giving scene in which she, Naima, is the agent, as she accomplishes the act of giving her mother blueberries. She expresses the agent and the verb with the expression “Naima give” and then in the next production the agent and the object. She therefore completes the whole structure at the end of the dialogue but with a little scaffolding from her mother. Each utterance is telegraphic, but together they express a complete event. The same conventional participant structure gives Naima a way to express each of the different arguments semi-independently.

Her productions differ from the input for both pragmatic reasons (use of imperatives in child-directed speech, infrequent in the children's productions except in set expressions) and cognitive-developmental reasons (missing arguments). But over time, thanks in part to her cognitive capacities, experience and amount of exposure, and in part to the adults' recasts, reformulations and expansions in conversational exchanges as we witness in the previous example (Clark 1998, Chouinard & Clark 2003), she will fully acquire the adult patterns.

Table 1: Examples of Naima's first uses of give constructions

Age	Utterances
1;03	Naima give Give Mommy
1;08	Give it Daddy card Give it to Lily Give it back to her
1;11	Mommy gave me some apricot juice to drink
2;01	yy giving Mummy the cake Who gave us the cake?
2;05	Daddy, give me your piece of egg yolk
2;08	I want you to give me another one
3;10	No, I don't take things back that I give. And then we're supposed to give you things that you don't want.

Interestingly, development seems to involve not just imitation of observed input but also creative analysis and reanalysis of the input, as indicated by novel instances observed especially when the children start using complete patterns. It is through creative piecemeal assembly of the

linguistic constructions they have at their disposal, that children can gradually build larger and more complete utterances.

In the case of *give*-events, early utterances thus fall mainly into two categories: a parental request for a child to give her something, or a parental commentary about either her own or the child's giving action. Later, the child takes a more active role in initiating transfers, using increasingly better-formed language for each phase. This progression may indicate that the child has mastered the "script" of such interactions, where the predictable nature of the event structure provides a convenient entry point to language (Nelson 2007). We further observe extended interactions in which the phases above each involve multiple steps. In these situations, it may instead be the well-established language associated with simpler events that provides the conceptual scaffold for the child to grasp more complex events. Overall, the complex event structure of giving, the child's daily acting out those event structures with her parents, moving to pick up objects, feeling the object in her hands, handling it and handing it out to her partners, and the variety of ways of talking about it, provide the means for the concurrent development and mutual reinforcement of language, of the sensations felt during the experience and of conceptualization.

At 4 years old, Madeleine for instance has internalized language along with her mother's role, after having lived for over a year with her new baby brother in the house. The following example shows how she can project feelings unto her doll. Her gestures and facial expressions have become as sophisticated as her speech. She is a mini-replica of her mother but has added something of her own personality unto the scene.

Example 10. Madeleine, 4 years old.

Madeleine : Celle-ci c'est un gros bébé (This one is a big baby).

Observer and Madeleine laugh.

Madeleine : elle veut, elle veut... en fait ils ont pas encore l'âge de dormir tout seuls et du coup ils dorment dans mon lit, et celle-ci c'est madame je veux dormir à côté de maman. (she wants, she wants... in fact, they are not old enough to sleep alone, and therefore they sleep in my bed, and this one is Mam « I want to sleep next to Mummy ».)

Madeleine laughs.

Observer: Ah !

Madeleine : Elle veut absolument... moi je dors ici, et il faut absolument qu'elle soit ici. (She absolutely wants... I sleep here, and she must absolutely be there.)

Madeleine climbs on her bed and shows the specific places where she and the doll sleep.

Madeleine : Si elle n'est pas ici elle RONCHONNE (If she is not here she GRUMBLES).

Madeleine makes a very expressive gesture as she says « ronchonne ».

Observer : Elle ronchonne, bon d'accord.

Madeleine : Enfin... elle pleure quoi. (Well, I mean she cries).

Observer : Elle pleure (She cries).

Madeleine : Je préfère la mettre à côté de moi que d'entendre des pleurs toute la nuit hein. (I'd rather put her next to me than to listen to her crying all night long).

Madeleine accompanies her speech with expressive facial expressions and gestures.

Observer : T'as raison. (you're right).

Conclusion

Children's increasing capacity to analyze the input seems to guide their usage. When they need to express their sensations, their inner feelings and thoughts, they assemble pieces of various structures they have associated in similar situations without having full control over the complexity of each grammatical marker or each construction. But the morsels of language children link to specific sensations in specific situations bear traces of the subjective attitudes of the speakers heard in previous similar contexts as well as traces of intersubjectively constituted properties of these sensations across situations (Ochs, 1996). The words used are thus tied to the contexts of their previous uses and evoke the sensations associated to those contexts thanks to the expansion of children's memory span. Progressively, the child internalizes the adult's role and appropriates linguistic tools, social codes and behaviors, which are intertwined in language, in and thanks to dialogue. The multimodal construction process of linguistic tools and structures, impregnated with the sensations experienced in situated contexts, takes place through collaboration between adults and children.

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