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Reduplication before two years old

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In the past two decades, there has been a great amount of work on reduplication in various individual languages and some attempts to generalize the properties of this process. But very few links have been made between theoretical treatments of reduplication in general linguistics, and reduplication in child language development. Reduplication plays an important role in children's language development and the analysis of children's reduplicant productions might shed some light on the functions of reduplication in language.

Studies on children's reduplicative productions have highlighted the relationship between phonological, morphological and lexical acquisition. But on a broader scale, we would like to demonstrate that reduplication is a productive phenomenon both at the level of language behavior and at the level of the content of speech productions. It reflects the child's acquisition of pragmatic functions as well as the child's appropriation of the language system.

It has been observed that after an initial period, babbling becomes reduplicant. During the babbling stage, it is difficult to attribute specific communicative intentions to children's first use of reduplication: sounds are duplicated in exactly the same way with the formation of syllabic sequences (Stark 1986). These first productions are said to reflect "mechanical constraints" and could be the result of the rhythmical alternation when the child opens and closes his mouth. (Mac Neilage & Davis 1990). However, the first sequences containing reduplications form patterns, which might help the children in the construction of their own phonology. In a cognitive perspective, their phonological play activity and experimentation enable them to discover phonological regularities in the organization of their mother tongue. Those who see reduplication as a universal phenomenon (Moskowitz 1973), explain that the process is of great importance for word-formation since it is a step in recognizing and controlling syllables and segments as phonological units.

Reduplication may also be regarded as an individual strategy used by some children more than others. During the earliest stages of phonological and lexical development, the children who choose to follow a multisyllabic course of development use reduplication to master the complexity of polysyllables without having to simultaneously deal with greater phonetic complexity. It has been observed that children who use many reduplications, have a larger proportion of polysyllabic productions. The conclusion could be that those children try to maintain the multisyllabic form of the adult targets (Klein 1981, Ferguson 1976). Reduplication - the repetition of the consonantal and vocalic features of one part of the word - enables them to create a pattern and simplifies both the structure and the articulation of the word. It seems that keeping the right length for the word is more important than getting the different syllables right.

It may be agreed that reduplication is a "general pattern that all children follow in varying degrees" (Fee & Ingram 1980). At some point there is a transition from reduplication linked to

physiological and mechanical constraints accompanied by playful experimentation, to reduplication linked to phonological, morphological and lexical awareness. Reduplication therefore prepares for the typical form of the word and shows how important the word is as a unit of phonological acquisition (Lleo 1990).

It can be observed that at around 18 months children still prefer binary configurations (one single reduplication), especially when they interact with an adult, and that they continue to use them for some time. Children's first words are often either characterized by the use of consonantal harmony ('gâteau' (cake) is produced as [tato]), or of reduplication ('auto' (car) produced as [toto]). Reduplication is therefore one of the children's main simplification devices. It simplifies the process of storing and producing a growing amount of lexical items. The process is so dynamic that a lot of childhood reduplications have been introduced into the adult norms of the community in many languages ("dodo" in French, is "derived" from the verb "dormir" (to sleep) and may refer to a bed as well as sleeping). But reduplication has also been identified as one of the characteristics of motherese (Ferguson 1977). It is not easy to draw clear hypotheses to explain those facts. A mechanical phenomenon typical of children's babbling may have influenced parental speech. But reduplications in motherese may also induce more intentional reduplications in child language.

The children's interest in repetitions and formats can also be taken into account in an analysis of their use of reduplication. In his work, Bruner (1984) mentions a link between the concept of format and the semanticity of doubled syllables. Moreover, various authors have stressed the psychological importance of repetition patterns for the passage from single-word utterances to multi-word utterances. Those patterns are useful for "breaking the single-word functioning of the young child and for 'building up' new solutions at the level of multiple-word speech" (Veneziano, Sinclair & Berthoud 1990). These observations can lead us to link what the literature calls reduplication (doubling of a syllable) and repetition (doubling of a word) and analyze those two processes as strategies, used during transitional stages, which would enable children to lengthen their words and their utterances.

METHOD

Most of the studies on reduplication in language acquisition analyze children's reduplications in their first words from about 20 months old and later. In this article, we would like to try to pinpoint the earlier period when mechanical constraints seem to be transformed into more intentional patterns.

We are interested in the transition from reduplication linked to physiological and mechanical constraints to

- 1) reduplication linked to phonological, morphological and lexical awareness and the acquisition of the language system;
- 2) reduplication linked to the awareness that language has functions and the acquisition of language behavior.

In order to distinguish the various roles reduplication may have in child language development, we decided to code and analyze all Reduplicative Productions (R.P.) in the longitudinal data of a child.

Subject

We used the longitudinal case-study of a monolingual French little boy in spontaneous interaction with his mother. The child was videotaped and audiorecorded between the ages of 0;2 and 1;10, in his home for half an hour sessions every two weeks. The audio recording was made on a cassette taperecorder using a high quality microphone. The microphone was attached to the child from the very beginning (two months old) and he was quite used to it.

However the child had the particularity of being a late talker. At two years old, he had a very limited number of words in his lexicon. It was very frustrating at first for the researcher, but we realized that as far as reduplication is concerned, he was a very interesting case.....He stayed in the reduplicating stage for a longer time than usual. The child was "slower" in a way, but he followed the same developmental pattern as other children, and we had more time to study what was displayed. This case might illustrate the argument of Ferguson (1983) suggesting that "extensive use of reduplication may represent an overall developmental strategy in phonology, possibly typical of slow developers." At the age of four, the little boy's language level was similar to that of a typically developing child.

Procedure

The child's productions were transcribed in IPA, all his gestures and mimics were described and the intonation was analyzed using ANAPROZ (a software developed by the University of Paris III for that purpose). An electronic data-base was constituted using ACCESS. The data was collected by the first author for her PHD thesis on intonation and gestures before two years old and the transcriptions were checked by the second author. The following figures give examples of the result of an analysis using Anaproz :

- 1) the child says ta ta ta ta, in red you have the variations of intensity, in black you have the variation of fundamental frequency, that is of the melody (the prosody).
- 2) The child says ii.

This case-study, the data-base and the software to analyse the child's intonation patterns constitute a very useful tool to work on any problem concerning language acquisition before two.

We chose to investigate how the reduplication of a sound, a phoneme or of a syllable can have various functions during the language acquisition process : how it participates in the interaction process, in the construction of the lexicon, and could take on a pre-grammatical function.

I QUANTITY

Our first step was to look at the percentage of reduplications out of the totality of the child's productions. We had a very broad definition of reduplication: we coded as reduplication each production in which the same sound or the same syllable was produced at least twice in a short laps of time (the pause could not be longer than one second). The counting and the percentages were obtained by extracting the reduplicative babbles and utterances selected for this study from computer digitizations. The result is shown in the following graph.

GRAPH

The result is not very significant. It only shows us that there are reduplications from 0;2 to 1;10. We therefore had to proceed to a finer categorization in order to be able to attribute some meaning to the use of reduplication by the child.

We followed three steps:

- 1) We analyzed the data as a whole and formulated first intuitions
- 2) We used perceptual characteristics to differentiate the various kinds of reduplicative productions
- 3) We conducted a qualitative analysis of the data, coding the data according to the various functions we could attribute to the child's reduplicative productions.

1) FIRST INTUITIONS

Before the age of about 1;3, it is difficult to attribute a discursive purpose or a discursive intent to the child's reduplication of sounds. However two characteristics can be drawn:

- Series of identical sounds are used when the child is extremely excited. It seems to be a way to unload his energy. He may be using a physiological means to release emotions and affects. But there seems to be some type of minimal organization in the very fact that the sounds used are identical, there are not sounds chosen at random.
- We can notice that the child's productions are longer when he is engaged in an interaction with the adult and that they contain more reduplications. Reduplication could therefore be used by the child to lengthen his productions as mentioned in the literature.

We asked ourselves why he would lengthen his productions and after analyzing the contexts in which he does so, it seems that he wants to attract and keep his mother's attention.

When the child simply takes an object without looking at his interlocutor, he says "a". When he shows it to his mother he says "a a a a a".

C takes a pear

C 53 - a

He drops the pear

C 54 - a

He picks up the pear, loses his balance, looks at his mother. Then, as he gives the pear to his mother :

C 55 - a / a / aaaa

The child seems to want to make noise like the adults, as much noise as the adults, but not just any noise: series of sounds that have some kind of meaning. He grasps that there is a certain organization in the adults' noise, that they don't produce just any sound, that there is a purpose to that noise, and that the purpose might be to INTERACT. The child's use of reduplication might therefore show that he wants to play a more important part in the interaction in progress. He uses one of the phonemes, or at least one of the sounds, he has mastered, because in doing so, he doesn't need to worry about the physical production of the sound and the constraints it would imply. He then reduplicates that phoneme to play his part in the game of verbally interacting with the other.

It reminds us of the process a musician goes through if he wants to master a difficult segment in a piece of music. If he is a cellist for example, he will play on an open string with his bow, without worrying about the left hand and fingers which usually enable him to change notes, and he can concentrate on the bow movements (up-bow, down-bow). We are close to Fee & Ingram's observations suggesting that Reduplication is a strategy used by some children to master the structural complexity of polysyllables without simultaneously coping with greater phonetic complexity (1983).

Therefore, we cannot attribute a semantic value to most of the child's reduplications before 1;3. They seem to have mostly **conative** and **phatic** functions and not a referential function.

At 1;3, we can distinguish clearer discursive intents. We therefore tried to lead more detailed analyses to differentiate them.

2) PERCEPTUAL CHARACTERISTICS

We decided to analyze the child's reduplications according to how we, as listener, could perceive them. We tried to find what perceptually differentiates the child's various reduplications. Two very simple characteristics can be taken into account:

- A) Whether the reduplications are simple reduplications (one reduplication: *m* or multiple reduplications (several reduplications: *mmmmmmmmmm*).
- B) Whether the reduplicated sounds are separated by a pause or not

1) Number of reduplications

GRAPHIQUE 2

The following graph shows the percentage of simple reduplications and multiple reduplications over the total number of productions.

The difference only becomes significant as of 1;4.

GRAPHIQUE 3

Percentage of simple versus multiple reduplication.

The number of multiple reduplications is significantly less important than the number of simple reduplication at the end of the data.

2) Length of the pause

It is easy to perceive whether there is a long pause (70 milliseconds) or close to no pause at all. But it is not a very relevant characteristic until about 1;2. Then reduplications with a pause tend to be less numerous than reduplications with no pause.

CHART OR GRAPH

In the second part of the data, the child produces more simple reduplications, and more reduplications without a pause. He seems to display more control, his productions are more calculated and we could link that to a capability to produce intentional meaning.

Now that we have two perceptual distinctive characteristics, let us examine how they are distributed according to the functions we can attribute to the child's reduplicative productions.

C) QUALITATIVE ANALYSIS.

In order to attribute semantic values to a child's production, we need to analyze the productions in context. We draw as much information as we can from the situation and from the interlocutor's reactions to the child's productions. In order to extract, distinguish semantic values we must interpret the child's productions according to the linguistic and extra-linguistic context.

We drew a first distinction in terms of decidable/indecidable use. Among the productions coded as "decidable use", we distinguished three values of the reduplicant productions. We called them conative value, pre-grammatical value and referential value.

- a) The **conative** value: to draw and maintain the other's attention and therefore to trigger or maintain the INTERACTION.

We used contextual criteria to draw this category: the child holds out his hand towards an object and looks at the adult, or holds out his hand to give the adult an object. He shows, he gives, he asks for.

We can refer to the verbal production in association with the non verbal behavior as being the equivalent of a language act.

Example C (1;3,18)

C holds out his hand towards the table and waves it.

C - m m□

(It does not work.) C points at the mug

C - m :

C has finally obtained the mug. He whimpers. He puts the spoon in the mug, drinks out of the mug. He alternates drinking tea out of the mug and out of the spoon. His mother takes the mug away from him and puts it out of reach. He puts his pacifier in his mouth. Takes it out and holds out his hand towards the mug.

C - m / m / m / m m m

As we can see in this extract, the reduplicative production is in competition with the lengthening of the sound.

b) the pre-grammatical function: enumeration

We can note that it concerns multiple reduplication with a longer pause between each sound.

There happens to have been only one session in which this function was used by the child, but very extensively. There was the right context to enumerate for there were various objects of the same kind and the child took one object after the other as he repeated the same sound.

We note that there are as many R.Ps as items the child is referring to. Besides he points to each object, holds each object, or puts each object down.

The units are separated by a 70-centisecond pause to enumerate referents. We can therefore conclude that each reduplicated syllable or phoneme is a separate item.

In this case, since there are as many units as referents, reduplication clearly has an iconic quality. But this could be a pre-grammatical process and prepare the child to the use of the category of distributivity.

Example C. 1;5,29

C. picks up the dominoes and throws them on the sofa one by one (at the end he misses and complains).

C - m / m / m / m / m / m / m :::::

c) the referential function

These types of reduplicative productions are the most studied in the literature. The perceptual characteristics are: always a simple reduplication, no pause.

The verbal productions refer to the object pointed at by the child, which thus becomes a discourse object. We can say that in certain contexts, the reduplication of syllabic [m m] or vocalic sounds, [i i], enables the child to establish a rhythmic pattern similar to the signifier composed of two syllables, which can be used for all kinds of referents. The child produces two identical sounds separated by an extremely short pause or no pause at all. This configuration could be viewed as a single, lexical type, unit. Reduplication might therefore be a strategy used in the construction of the lexicon in so far as it enables the child to produce a general pattern, which stays the same for all referents.

The contexts are:

- 1 direct imitation of the adult

EXAMPLE C. (1;7,10)

M - C'est quoi ? Tu dis bonbon? (What? You're saying candy?)

C - bm bm

The child's production has the same intonation and the same formatting as the lexical item in the adult's utterance

2 the child is pointing at an object and produces his reduplication. He designates an object and denominates it

EXAMPLE C (1;8,7)

C. points at the television

C - i i

3 the child's utterance follows an adult's categorial question which concerns the name of an object EXAMPLE:

M - C'est quoi ça? (What is this?) Pointing at the book they are about to read.

C - ii

Here are other examples to illustrate the use of this pattern

EXAMPLES

C 1;10,18

M - Ça y est? (*Done?*)

C - yeye

C 1;7,24

M - Encore tototte, pas tototte alors, tu veux encore bonbon? (*More suckie, no suckie then, you want more candy?*)

C - m :

M - Encore? (*More?*)

C - koko

The quantitative results of our analyses are presented in the following graph.

The indecidable use clearly diminishes at the end of the data. A clear conative function begins very early (9 months). The distributive value occurs at 1;5, 28. The referential function can be identified at that same age and increases afterwards.

The following table shows the result of the combination of these functions with the perceptual criteria we have mentioned (number of reduplications and pause).

Perceptual characteristics	Pause	No pause
Multiple reduplication	Enumeration Conative value (to lengthen and maintain the interaction)	
Simple reduplication	Conative value (to intensify or trigger the interaction)	Referential value

Reduplication plays an important role in the child's acquisition of language behavior, it is one way for the child to demonstrate his intention to communicate and could have the specific purpose of triggering and maintaining the interaction, but also of intensifying or emphasizing

the content of the utterance. That function is paralleled in adult language as in English when we say *he's a bib big boy*, or in a more grammaticalised way in Yoruba *mura kia kia* (to get prepared fast fast)

But reduplication also plays a role in the child's appropriation of the language system. His use of reduplication to enumerate objects could be considered as being iconic. Moravcsik (1978) remarks that "a tendency has been noted for languages to use reduplicative patterns for the expression of meanings that have something to do with the quantity of referents" and she calls that tendency an "onomatopoeic use of a form device". This function of reduplication which is often grammaticalized in some adult languages:

In Kannada (South eastern Asian language) *manne manne* (each house), in Pangasinan (Austronisan) *manok* means chicken and *manok manok* chickens.

The reduplicative productions with a referential value which enable children to build, enrich their lexicon may be more specific to language acquisition, but, probably under the influence of this dynamic acquisition device, a certain amount of lexical words in various languages consist in reduplicated syllables.

EXAMPLES in child language. In French child language *koko* (œuf/egg), *pinpin* (lapin/rabbit) *toto* (bateau/boat).

CONCLUSION

Our conclusions are drawn from the close study of one single child and can only be hypotheses that have to be taken as a starting point for further analyses of reduplicative productions in much more data and in various languages.

The child we have studied had a very limited number of phonemes at his disposal. But a late learner can teach us a lot on language acquisition and the strategies used by children. He gave us the possibility to study how the same reduplicated phonemes [i:], [a], [m] can be distributed in three categories and take on different functions, according to the way they are used.

The results of our study indicate that after the age of nine months, there are three different types of reduplicative productions (R.P.) in our data:

- R.P. with a conative value. It concerns the triggering or the maintaining of the interaction and it can be treated as a pragmatic function linked to speech production or language activity.
- R.P. with a "pregrammatical" function. It concerns grammaticalisation and the use of the system. This function is linked to language as a formal system. The reduplicative process is used to enumerate a series of similar referents. It therefore has a clear iconic quality relating the content of the verbal production to the extralinguistic world.
- R.P. with a referential value. These productions are linked to the process of word-formation, the building of the lexicon, and therefore to the appropriation of language as a formal system with its phonological and morphological rules.

These conclusions do not tell us if a pragmatic, semantic or phonological generalization can be made on reduplication in child language and if a unified principle might account for the numerous functions of reduplication (Harrison 1973). In the contrary, we have seen that the

three types of reduplicative productions we have distinguished differ in their function and in their form: presence or absence of a pause and number of reduplicants. We have of course used a very broad definition of reduplication. However, this doubling of phonological material (a sound, a phoneme or a syllable) we have been trying to describe and analyze does seem to be a very productive device, resulting from the interaction of pre-linguistic and linguistic processes, easily accessible to children and which they resort to for various purposes. We can only propose one very iconic common denominator for the triggering of reduplicative productions in the child under study: an adding process. Indeed, when the child wants more interaction (pragmatic function), when he wants to refer to more referents (distributivity), or acquire more words (building of the lexicon), he uses reduplication.

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