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THE ACQUISITION OF SPATIAL POINTS OF VIEW  
AS A COGNITIVE PREREQUISITE FOR THE ACQUISITION OF DEIXIS:  
EVIDENCE FROM RUSSIAN CHILDREN'S  
SPEECH PERCEPTION AND PRODUCTION

The purpose of the research was to examine the cognitive prerequisites for children's perception and production of deictic elements. It was assumed, following Slobin's (1973) theory of cognitive prerequisites for grammar development, that children must understand spatial viewpoints in order to acquire deixis. Comparing Russian data to English (Loveland, 1984), it was found that – contrary to Loveland's results – children could understand self-addressed personal pronouns before understanding spatial viewpoints. By taking a functional approach to child language development, this contradiction was resolved by proposing a stage development in the acquisition of both spatial viewpoints and deictic elements: (first) incomprehension, (second) egocentric understanding, and (third) adequate understanding.

## **Introduction**

Many studies (Budwig, 1985, 1989, 1990a,b, 1995; Budwig & Wiley, 1991; Charney, 1980; Chiat, 1981, 1986; Dobrova, 1996, 1997a) have indicated that one of the main difficulties for a child under the age of 3 is to understand personal pronouns and to start using them adequately in his/her own speech. The goal of this research is to find the cognitive prerequisites which precede children's perception and production of deictic elements.

This research is based on Slobin's theory of cognitive prerequisites for the development of grammar (Slobin, 1973), and presupposes children's understanding of spatial viewpoints as a developmental route for the acquisition of deixis.

Contrary to previous studies, we found that children could understand personal pronouns directed towards themselves before they understand spatial viewpoints. Nevertheless, we do not interpret these results as a proof of the non-existence of a causal relationship between the child's understanding of spatial viewpoints and his/her acquisition of deictic elements. We suggest that the "understanding" of personal pronouns may not be real understanding, but a manifestation of an egocentric stage in the child's development when the

child does not understand the personal pronoun as a real deictic element. In this case, this “understanding” does not contradict the hypothesis that the acquisition of spatial points of view is a cognitive prerequisite for the acquisition of deictic elements.

### Data and method

The research is based on the experimental study of 38 Russian children aged 17-37 months. On the whole, the research addresses the issue of differences in the children’s use of pronouns/nouns in reference to themselves and others and how children perceive and produce personal pronouns (see Dobrova, 1997b, 1999). In this paper we will focus only on one problem and only on one part of the results: on the connection between the child’s understanding of the viewpoints of others and his/her acquisition of personal pronouns.

Experiments on children’s understanding of the viewpoints of others are traced back to Piagetian experiments known as the test with “3 mountains” in which the children’s ability to understand different spatial viewpoints was investigated. One of the researchers who continued investigating children’s understanding of spatial viewpoints was Loveland (Loveland, 1984). Our experiment partly uses Loveland’s questions and tasks but, as will be demonstrated below, we were interested in additional aspects of the issue and came to different conclusions.

In our experiment there were 13 questions and tasks: 11 of them checked the children’s understanding of personal pronouns and 2 tasks (number 7 and number 8) dealt with the children’s understanding of the viewpoints of others.

### Questionnaire and explanations

- 1) (The child, the child’s mother and the experimenter drew some “pictures” which were then gathered together)  
*ĀāĻ ēřđň č í ēř, ēĭň í đđĭť í ř đčńĭ āřē (í ř đčńĭ āř ēř) ŃŮ?*  
Where is the picture drawn by YOU?
- 2) *Đĭ ēřčč, āāĻ ŃŮ ħĭ āĭĭ ħđřē (ħđř ēř)?*  
Show me where YOU slept last night?
- 3) (The child, the child’s mother and the experimenter were given different toys which were then gathered together)  
*ĀāĻ čāđó ř ēř, ēĭň í đđĭť ĩ āř āř ēř ŃĻĀĻ?*  
Where is the toy which I gave TO YOU? (dative case)
- 4) (The child, the child’s mother and the experimenter were given different sheets of paper which were then gathered together)  
*Đĭ ēřčč, āāĻ Ó ŃĻĀĔ áóē ř č ēř?*  
Which sheet of paper belongs TO YOU? (genitive case with a possessive meaning in Russian)
- 5) (The child, the child’s mother and the experimenter were given different toys. It was known that the child was able to pronounce the names of all three toys)  
*×ňĭ ŃŮ āĭ đč č ř ů?*  
What do YOU have [in your hands]? (in Russian the words in the square brackets are not pronounced)
- 6) (The child, the child’s mother and the experimenter exchanged the toys – see the previous question)

×ñî · äĺđć ó?

What do I have [in my hands]? (in Russian the words in the square brackets are not pronounced)

- 7) (The child's mother was standing on the opposite side of the room. The child was given a picture on one side. The experimenter tried not to allow the child to leave her place and run to her mother)

Ďîęřćċ ěřěĺ ěřđňċíęó

Please show the picture to your mother

- 8) (The situation is the same – see the previous question. The child was given the two-sided picture. On the one side was a dog, on the other side a cat. The mother had previously specified that the child was able to name both a dog and a cat. The child was given some time to study the picture and to understand that it had two sides. Then the picture was placed so that the child saw the one side and the child's mother saw the other side)

×ñî âċăċň ěřěř?

What does your mother see?

- 9) (The child, the child's mother and the experimenter were given different objects – as in questions #5 and #6. All the names of the objects were well known by the child)

×ñî Ó ŃĹÁβ â đóęřó?

What is IN YOUR hands? (NB: in Russian a personal pronoun in the genitive case with a possessive meaning is used, not a possessive pronoun.)

- 10) (The child, the child's mother and the experimenter exchanged the objects. The experimenter took the object which had been in the mother's hands)

×ñî Ó ĚĹÍβ â đóęřó?

What is IN MY hands? (NB: in Russian a personal pronoun in the genitive case with a possessive meaning is used, not a possessive pronoun.)

- 11) (The situation was the same as in the previous question. The child was asked about the object which was in her hands)

Ěñî äĺđćċň ... (ířċâříċĺ ċăđóřęċ, ěř ģ đóř äĺđćċň đĺáĺííę)?

Who has a ... (the name of the object) [in her hands]? (in Russian the words in the square brackets are not pronounced. The purpose of the question is to check how the child will name herself)

- 12) Ääĺ Ó ŃĹÁβ óõî?

Where is YOUR ear? (in Russian a personal pronoun in the genitive case with a possessive meaning is used, not a possessive pronoun.)

- 13) Ääĺ Ó ŃĹÁβ íň?

Where is MY nose? (in Russian a personal pronoun in the genitive case with a possessive meaning is used, not a possessive pronoun.)

All answers were systematized and different kinds of answers were given different code indices. In evaluating the answers to the questions checking the children's understanding of 1st and the 2nd person pronouns, we gave minimum marks to answers which demonstrated a lack of ability to understand the personal pronoun, when the child totally ignored the presence of the pronoun in the question. Answers which demonstrated some differentiation of the objects in accordance with the mentioned personal pronoun, but falsely imputed the object to the child herself (egocentric answers) – were given higher marks. The maximum marks were given to the correct answers.

In the tasks and questions 7 and 8 the ability to understand the other person's viewpoint was checked. As in the questions with the personal pronouns, the evaluation of the answers was based on the following principle: minimum mark to the answers which demonstrated an inability to recognize another person's (spatial) viewpoint; somewhat more when the child understood only her own viewpoint as the only possible viewpoint (egocentric reaction); maximum to a correct answer (cf Example 1 below of how the answers to the questions on other people's viewpoints were ranged).

### Example 1

The task 7 (*Show the picture to your mother* – the mother standing on the opposite side of the room)

0 – incorrect answer

9 – correct answer

If the answer was incorrect:

0 – no answer

1 – the picture is not turned in any clear direction, the child does not pay attention to the direction of the picture (up, down, sideways)

2 – the picture is not turned in any clear direction, but is a little more directed towards the child herself than anywhere else (between 1 and 3)

3 – the picture is directed towards the child herself (egocentric answer)

5 – the answer cannot be evaluated for a technical reason (for example, the child broke away from the experimenter, ran to her mother, stood near her and showed her the picture)

7 – the direction of the picture cannot be ascertained as being turned to a specific person, but is directed towards the child's mother more than towards somebody else.

If the answer was correct:

8 – the picture is directed towards the child's mother, but upside down

9 – correct

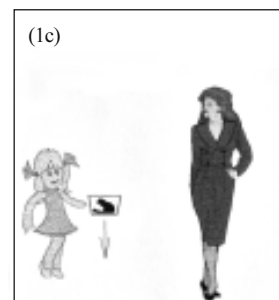
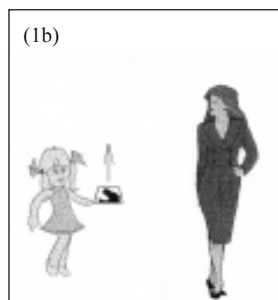
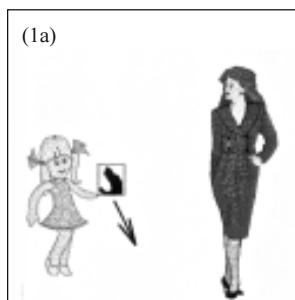
We distinguished 3 main kind of answers, with special attention to the egocentric answers:

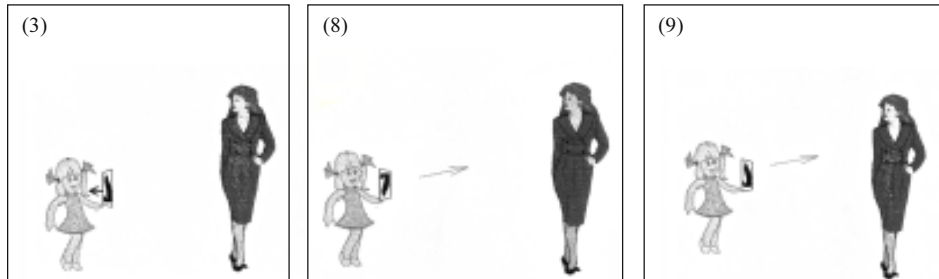
a. wrong ones – when the child did not have any ideas about viewpoints;

b. egocentric answers;

c. correct or nearly correct answers (whereas Loveland was interested only in the fact whether the child directed the picture to her/his mother or not).

The main types of children's responses to task number 7 are schematically pictured below:





All the children's answers were evaluated and summarized. Answers to the questions that checked their understanding of personal pronouns were compared with their reactions to the tasks concerning the spatial viewpoints of others.

The hypothesis is that children's understanding of the viewpoints of others is a cognitive prerequisite for the acquisition of pronouns. If so, the understanding of the viewpoints of others (as we presupposed when we started our experiments) has to appear before the understanding of personal pronouns.

## Results

We obtained two sets of results. The first set concerned the children's understanding (real or false) of the 1st and 2nd person pronouns. The second set of results concerned a comparison of the acquisition of pronouns with the acquisition of other people's viewpoints. In order to interpret the second set of results, it is necessary to start with the first set.

The results concerning children's understanding of 1st and 2nd person pronouns are not identical with those of previous studies of children's acquisition of personal pronouns. On one hand, our results show that children differ greatly in their choice of the form used for self reference and for reference to others: the personal pronoun or personal name and term of kinship. So the Russian data support the findings of several researchers from other countries (see Bates et al., 1988, for references) about two types of children – pronoun “lovers” and noun “lovers”. On the other hand, our results show that these two ways of reference to people (pronouns/nouns) are much more similar than it seems from the formal point of view. Children's use of pronouns/nouns have the same function not only in pragmatics (different means of naming the same person), but they are grammatically close as well. Our results show that the 1st person “pronoun” in production and the 2nd person “pronoun” in the perception of children who use them from the very beginning, without the step of using their personal names for reference, are not real pronouns. They are understood by the child only, if addressed to herself, they are words with fixed reference (refer to the child herself). Figure 1 shows the dependency of children's understanding of the 2nd person pronoun on the child's age. The “hump-like” nature of the line may be seen.

This “hump” may be seen especially well on the diagram (Fig.2) with the children's understanding of the 2nd person pronoun in the genitive case (possessive meaning).

We observe that at a given age (before 25 months) children do not understand the 2nd person pronouns addressed to them. Then, from approximately 25 to 30-32 months, chil-

Figure 1. Understanding of the 2nd person pronoun

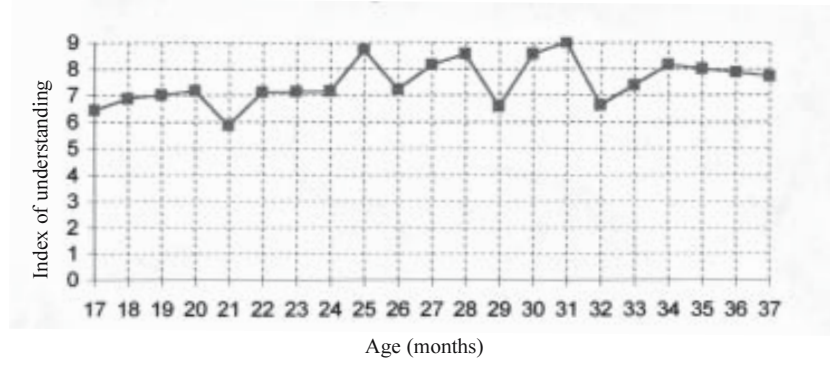


Figure 2. Understanding of the 2nd person pronoun – genitive case

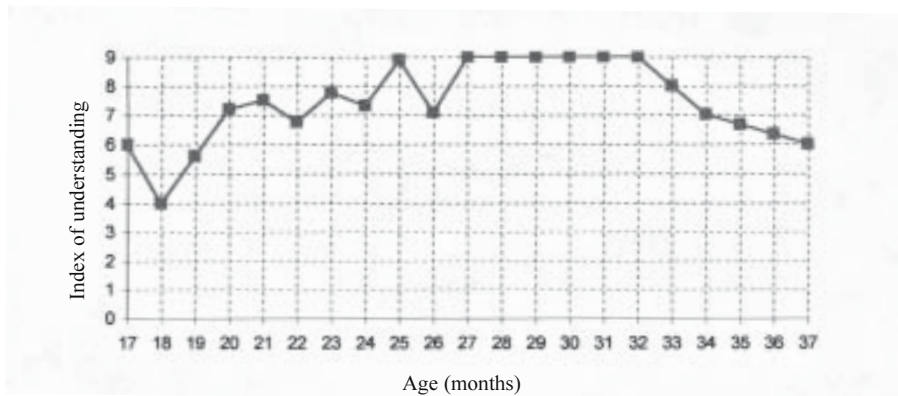
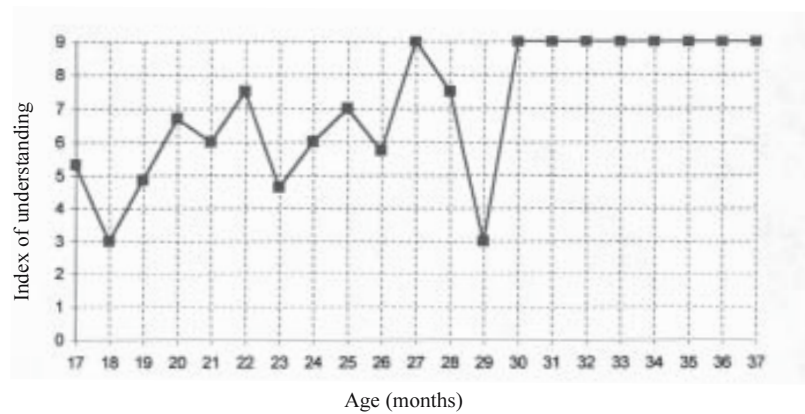


Figure 3. Understanding of the 1st person pronoun

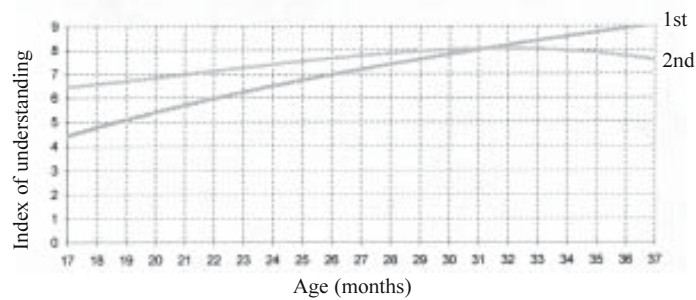


dren suddenly demonstrate a rather high level of understanding of the 2nd person pronoun. But it does not appear to be a real understanding. This idea is supported by the subsequent nature of the line. At some point after 30-32 months, the level of children's understanding of the 2nd person pronoun declines. This may demonstrate a period of inability to understand the 2nd person pronoun as referring only to the child herself.

The idea of a period of non-real understanding of the 2nd person pronoun may also be supported by comparison with children's understanding of the 1st person pronoun during the same period. Figure 3 shows that there is no such "hump" in acquisition of the 1st person pronoun. With some exceptions, the line grows slowly and reaches the highest level at 30 months.

The difference in the children's acquisition of the 2nd and the 1st person pronouns is demonstrated in the dependency trend of the acquisition of both person pronouns on children's age (see Fig.4)

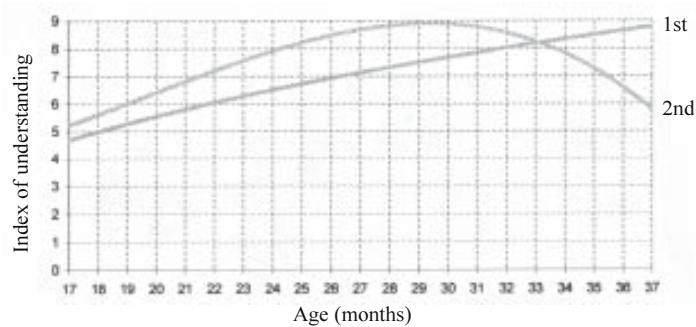
Figure 4. Understanding of the 1st and 2nd person pronouns (trends)



Especially obvious is the different nature of the acquisition of the 1st and 2nd person pronoun, seen in the trend indicating the acquisition of personal pronouns in the genitive case (Fig.5). It is obvious that there is a period of false (only egocentric) understanding of the 2nd person pronoun, whereas there is no such period in the acquisition of the 1st person pronoun.

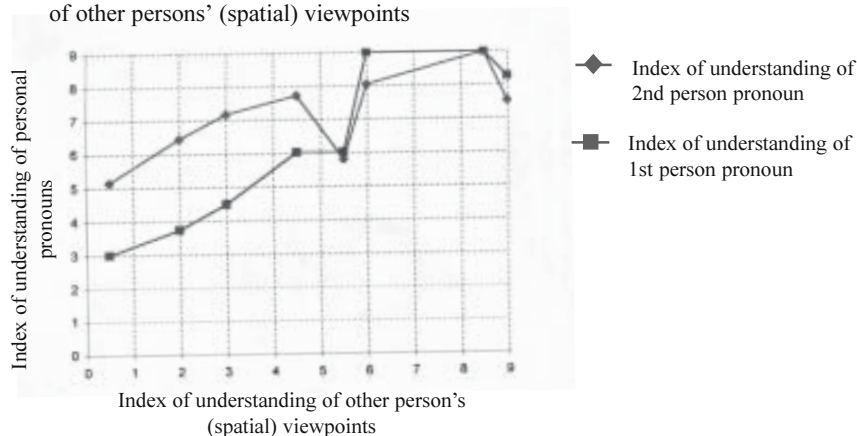
Having demonstrated the false (only egocentric) nature of early understanding of the 2nd person pronoun, we return to the second set of results – comparison of the acquisition of pronouns with the acquisition of other people's viewpoints.

Figure 5. Understanding of the 1st and 2nd person pronouns – genitive case (trends)



In Loveland's study (Loveland, 1984) the results were absolutely "homogeneous": in all children the acquisition of viewpoints preceded the acquisition of personal pronouns. In our study, on the whole, the results support the hypothesis that the acquisition of spatial points of view is a cognitive prerequisite for the acquisition of deixis (Fig.6).

Figure 6. Understanding of the 1st and the 2nd person pronouns in comparison with understanding of other persons' (spatial) viewpoints



But it is important to mention that our study was more detailed than previous studies, and therefore the results are not so homogeneous.

In our experiment with 38 children there were 7 children who demonstrated obvious outstripping of the acquisition of viewpoints: they understood the viewpoints of others before they understood personal pronouns. 15 children showed nearly the same level in the understanding of viewpoints and of personal pronouns. So, in 22 children (7+15) out of 38 the acquisition of personal pronouns did not precede the acquisition of other people's viewpoints. These results corroborate the idea that understanding other persons' viewpoints is a cognitive prerequisite of the acquisition of pronouns.

As for the other 16 children in our experiment, the results are not so clearcut. 6 children out of these 16 understood the 1st person pronoun before they understood the spatial viewpoints, and 5 children understood both 1st and 2nd person pronouns before they understood the viewpoints of others. But, by using our detailed system of indices, we see that all these 11 (6+5) children belong to the step of transition, of "conversion" from the egocentric stage to the stage of normal understanding of the viewpoints of others. So the "outstripping" of their understanding of personal pronouns seems rather unreliable. In any case, these results of course do not contradict the hypothesis that the acquisition of spatial points of view is a cognitive prerequisite for the acquisition of deixis.

The other 5 children out of the 16 demonstrated a different cognitive strategy. This part of the results seem especially interesting. These 5 children obviously demonstrated understanding of the 2nd person pronoun BEFORE they understood other people's viewpoints. At the same time, in their understanding of spatial viewpoints, these children belonged still to the egocentric stage. Now let us compare these results with the abovementioned results and conclusions concerning children's understanding of the 2nd person pronoun. It was concluded that the premature "understanding"



of the 2nd person pronoun is not a real one: the pronoun is understood as a word with a fixed reference only.

So we obtained a result which seems (at first sight) to be paradoxical: there are some children who understand the 2nd person pronoun before understanding other persons' viewpoints. But if we suppose this "understanding" of the 2nd person pronoun to be a false one, it means that there is no paradox. A child at some stage may understand the 2nd person pronoun not as a deictic element, but as a kind of a noun, and this stage may naturally outstrip her acquisition of spatial viewpoints.

Finally, it is interesting to look at the same results from the other side. There were 14 children who demonstrated their egocentrism in the understanding of other people's (spatial) viewpoints. If we accept all indices of the 2nd person pronoun acquisition belonging to the "hump", i.e. indices approximately 6.5 and more for the age 20-30 months, we see that 12 out of 14 "egocentric-in-understanding-other-people's-points-of-view" children belong to this "hump" group. In other words, these children are egocentric both in understanding other people's viewpoints and in understanding the 2nd person pronoun (as addressed only to the child herself). Thus these results do not contradict the hypothesis that the acquisition of spatial points of view is a cognitive prerequisite for the acquisition of deixis.

## Conclusions

Contrary to previous studies, children's possible understanding of personal pronouns addressed to themselves before their understanding of spatial viewpoints was revealed. Nevertheless, these results were not interpreted as proof of non-existence of a causal relationship between a child's understanding of spatial viewpoints and her acquisition of deictic elements. The apparent contradiction between cognitive non-abilities and grammatical abilities has been solved from the standpoint of a functional approach to child language. It was proposed that a child passes 3 stages in the acquisition of both spatial points of view and "grammatical/speech points of view" (deictic elements): (1) the stage of incomprehension, (2) the stage of egocentric understanding, (3) the stage of adequate understanding. So it was argued that the "understanding" of the personal pronouns may not be a real understanding, but a manifestation of the egocentric stage of development, when the child understands the personal pronoun not as a real deictic element. In this case, such "understanding" does not contradict the hypothesis that the acquisition of spatial points of view is a cognitive prerequisite for the acquisition of deictic elements. Thus our study produces evidence in support of the idea that there is a real relationship between the child's understanding of spatial viewpoints and her/his understanding of deixis.

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