Discourse Acquisition in 'Pear Stories' of Preschool-aged Children

Vladimir V. Glebkin (gleb1514@gmail.com)
Russian Presidential Academy of National Economy and Public Administration,
Prospect Vernadskogo, 82, Moscow, Russian Federation 119571**;**
Gymnasium 1514,
Krupskoi Street, 12, Moscow, Russian Federation 119311

Nikita A. Safronov (nikita1997.08.21@mail.ru),
Moscow Region State University,
Radio Street, 10, Moscow, Russian Federation 105005

Varvara A. Sonina (varvarasonina@mail.ru),
Gymnasium 1514,
Krupskoi Street, 12, Moscow, Russian Federation 119311

Abstract

This work focuses on an issue situated at the intersection of two domains: the oral mode of communication vs. the written mode of communication, and language acquisition. The backbone of this research is a conjecture that, for some age groups (babies, toddlers and preschool-aged children), to explore the acquisition of discourse as a whole (including gestures, facial expressions, prosody, pauses and discursive markers, etc.) is more appropriate than explore the acquisition of language exclusively. "The Pear Film" experimental line underpins the method of this research. The database comprises 74 'pear stories' of Moscow preschool-aged children and high school students. Three parameters of the discourse are of interest for the authors: a logical structure and a coherence of the narrative; gestures and spontaneous movements lost any communicative meaning; discourse words and pauses.

Keywords: multimodal communication, discourse, language acquisition, narrative, pear stories.

Introduction

The study of spoken language in contrast with its written form has been one of the most intriguing issues in cognitive science over recent decades. At the beginning of the paper it is worthwhile to outline the key points which underpin this avenue of research (Tannen 1982; Chafe 1985; Chafe & Tannen 1987; Miller & Weinert 1998; Holie & Adger 1998; Li & Hombert 2002; Linell 2005; Tomasello 2008; Fais et al. 2012).

Since its emergence as an independent branch of science, linguistics by default has been based on the structure of written language as a paradigm for language in general. This has deep roots in the backstory of linguistics. Although for the Ancient Greeks and the Ancient Romans speech and argument were important elements of both politics and everyday life, theoretical approaches to language developed by Plato and, especially, by Aristotle bore on written language. This held true, without any alternatives, in the philosophy of the Middle Ages. Linguistic views of patristics and, then, scholasticism were almost exclusively concerned with literacy. Afterwards, the ancient and medieval tradition strongly influenced early modern scholars in their view of language (Pascal, Descartes, Leibniz, Wilkins, etc.). As a result, some models of language as a formal system of symbols were developed which, in turn, inspired modern linguists to develop formal theories of language (Chomsky's works include abundant quotations from Descartes (Chomsky 1966, 2006), NSM theory by Wierzbicka and Goddard is, more or less, a replica of Leibniz's language of thought (Wierzbicka 1972, 1980, 1996), etc.). All these theories are based, as a matter of fact, on the framework of written language, even if their authors claim the opposite.

Although the view of language represented in the previous paragraph is likely to be a common place for linguists, this is anything but the truth. Importantly, unlike written language, spoken language is an element of multimodal communication, and it is absolutely senseless to explore spoken language beyond its links with other elements (gestures, facial expressions, prosody, pauses and discursive markers, etc.). Therefore, the only way to account for the framework and functions of spoken language in different communicative situations is to tackle the structure of discourse as a whole.

Such a change of perspective helps, in particular, to shed new light on the question of the origin of language. Thus, Tomasello (e.g., 2008) and colleagues take the social nature of humans as a basis for the research framework. For them, the demands of social nature cause a growth of both intensity and complexity of social communication which, in turn, leads to emergence of more complicated tools to perform that. These tools include gestures, prosody and, then, meaningful combinations of sounds as a part of multimodal communication.

This approach also changes standard views of the problem of language acquisition. Babies, toddlers and preschool-aged children acquire not exclusively language, but rather different types of discourse in which language is an extremely important but not the only element. Language acquisition goes for them in line with gesture acquisition, prosody acquisition, mimicry acquisition, etc.

This provides a theoretical framework of our research, whereas its experimental framework is based on "The Pear Film" research line. It is reasonable to outline

the milestones of "The Pear Film" story before proceeding to the structure and the results of the experiment.

"The Pear Film" is a six-minute movie made by Wallace Chafe and his colleagues in 1975. The film includes actions, pictures and sounds, but no words. In that, it deploys the same chain of events for all viewers. Therefore, a comparison of "the Pear Film" retellings, i.e. 'pear stories', by people of different cultures and languages can provide the researcher with important data of how language and culture influence a way people conceptualize a stream of events. Since 1975 a lot of investigations have been carried out to compare retelling strategies for people of different cultures (Du Bois 1980; Tannen 1980; Orero 2008; Matzur & Mickievicz 2012; Blackwell 2015), for people with intellectual disability (Cummings 2015, 59–63); some investigations have explored peculiarities of referential choice in retellings (Downing 1980; Clancy 1980), work of consciousness in narration (Chafe 1980; Bernardo 1980), a structure of multimodal discourse (Fon et al. 2011; Kibrik et al. 2015).

As mentioned, a structure of multimodal discourse is also the main object of interest for the authors of this paper. In general, we follow the model developed by Kibrik and colleagues (2015), but we are interested in a process dynamics rather than a static picture.

Let us proceed directly to the research presented in this paper. The 'pear stories' of Moscow preschool-aged children in comparison with similar stories of high school students were in the focus of our interest in this research. In other words, we addressed a particular type of multimodal discourse in order to explore the process of discourse acquisition by focusing on a logical structure and a coherence of the narrative, gestures and spontaneous movements lost any communicative meaning, discourse words and pauses. Before dealing this issue at hand, some clarifications are needed.

Firstly, the discourse of the pear film retellings is not an informal situation for subjects, especially, for kids. Indeed, in natural contexts kids communicate and, in particular, retell stories in different way. At the same time, this situation is not completely unnatural for them. This is a type of a public talk they encounter in kindergartens, at schools and some other public places. They acquire this as they acquire many other types of multimodal communication. So, despite obvious restrictions, this kind of discourse can provide important data on the way of acquiring particular elements of multimodal communication by preschool and early school-age children.

In order to monitor quality of acquiring particular discourse skills, a sample for comparison is needed. Adults are expected to be such sample; however, the work with 14-16 year old students shows that they are as skillful in "The Pear Film" retellings as adults are. In that, because of some practical reasons a group of such students was taken as a control group for our research.

In our analysis we focused on three discourse elements which need more precise description.

A. *A logical structure and a coherence of the narrative.* There are a lot of works investigating the narrative development in preschool age children which use a wide range of criteria to check this process (Peterson & McCabe 1983; Stein & Albro 1997; Sedov 2004; Nicoladis et al. 2009; Laurent et al. 2015; Levy & McNeill 2015). A commonly used parameters to check narrative development are as follows: the length of story in words; the number of different words used to tell the story; a total of scenes in retellings; presence of basic semantic components of the story (beginning, setting and ending) (Nicoladis et al. 2009; Laurent et al. 2015). However, these characteristics seem to provide only a coarse-grained picture of the process failing to verify how subjects represent a logical structure of the narrative, i.e. causal links connecting the events within it. A more precise model to evaluate exactly this factor was elaborated in Sedov 2004. In order to check to what extent subjects represent a logical structure of stories they retell, the author examines such variables as the frequency of deictic words in the retellings, the frequency of anaphoric repetitions, the frequency of introductory model words, referential models the subjects apply, the appearance of retrospective and perspective views in the retellings, etc.

Taking into account these and similar works, in our research we focused on the following characteristics: the total number of words exploited in retelling, discounting selfrepetitions and false starts (TW); a total of scenes presented in retelling (TS); a total of errors in action description standardized on 100 words (FA) (e.g., 'guys picked up pears' instead of 'the boy hands pears to one of the guys'); a total of errors in object description standardized on 100 words (FO) (e.g., 'apples' instead of 'pears'); a total of incorrect description of causal chain of events and sub-events standardized on 100 words (FC) (e.g., ambiguous reference, missing connections within an event and between events); a total of interpretations (TI) (e.g., 'stole a basket of pears' instead of 'picked up a basket of pears'); a total of dependent words standardized on 100 words (TD) (such as 'who', 'which', 'because', etc.).

B. *Gestures and spontaneous movements lost any communicative meaning.* As mentioned, a number of works has been published over recent years to explore various aspects of correlation between gesture development and spoken language development in narratives of preschool age children (Nicoladis et al. 2009; Laurent et al. 2015; Levy & McNeill 2015). Meanwhile, in our knowledge there are no works focusing on spontaneous movements lost any communicative meaning. Of great importance is the fact that kids, when retelling the story, perform a lot of unconscious movements which do not address their interlocutors. These movements are not gestures in the strict sense; the only function of such movements is to help kids in their reasoning and speaking. This is no metaphor to say that kids not only think with their brains and speak with their tongues, but they also think and speak with their bodies. Some evidence of this can be also found in students' and adults' retellings, but in this case such movements are presented in a restricted mode.

Again, in our knowledge this is a novel research domain which demands, first of all, a correct typology of spontaneous movements. A version of this is suggested below. Another important task is to measure the difference

in spontaneous movements of preschool age kids and that of high school students. This procedure is also presented below in the description of experimental method.

C. *Discourse words and pauses.* An important aspect of language acquisition is also, so to speak, smoothness of speech. Adults avoid pauses in communication and use different strategies to fill them (stretching out first and last sounds of the word, use of discourse words and single sounds, etc.). At the same time, kids are not embarrassed by gaps in communication. Their speech, at least, in this particular type of discourse, is, as it were, ragged. In the experiment we measured this difference. Also we compared a number of and a mean length of EDU (elementary discourse units) for the two groups of participants.

Experiment

Method

Subjects. 50 5-7 year old children (22 m, 28 f) attending Moscow kindergartens (CH), and 24 (10 m, 14 f) 14-16 year old Moscow high school students (S). All subjects were monolingual.

Material. "The Pear Film" by Wallace Chafe (6 min 32 sec).

Procedure. Each subject was processed individually. At the beginning the subjects were asked for watching the film closely in order to retell it as precisely as they can. Then they watched the film and after a minute retold it to some people who have not seen this film before. For kindergarten kids it was their kindergarten teacher, for students - their peers. At the same time, in order to check how the choice of addressee may influence the results, five students were asked to retell the story to the school principal in her office. When retelling, all subjects were sitting on high chairs for recording not only hand movements but also leg movements.

The retellings were filmed by a hidden camera for CH subjects and overtly for S subjects. Because of some technical problems only 37 from 50 CH video-retellings fitted for further examination (at the same time, all CH tape recordings were made properly).

Then the data were processed with ELAN to examine gestures and spontaneous movements. Also the retellings were recorded with unite-based discourse transcription system.

In order to work out TS we asked 10 independent participants to divide the film into episodes, and premised on their choice singled out eight basic scenes which formed the narrative framework.

Results

A. The results for narrative skills are presented in Table 1 and Table 2.

Table 1. Mean TW, TS, TI, EC for CH and S

	TW	TS	TI	TD
CH	88.2±45.9	5.3±1.6	1.5±1.0	1.0±1.2
S	298.6±138.2	7.8±0.7	4.7±1.9	2.4±1.1

Table 2. Mean FA, FO, FC for CH and S

	FA	FO	FC
CH	1.9±2.1	1.5±2.2	2.0±2.2
S	0.1±0.4	0.1±0.3	0±0.2

All these results are statistically significant ($p<0.001$).

Concerning five students retelling the pear story to the school principal, there were no significant difference between them and other students in the scope of this experiment. Retellings in the principal office were likely to be less detailed and more formal, but in comparison with CH subjects these discrepancies were not important.

The quantitative data can be complemented by some qualitative analysis. Let us begin with TW. As this can be seen from Table 1, the mean length of the narrative is over three times more for the students than for the preschool-aged children. It means that the CH subjects lose a lot of content when describing any episode. Importantly, they only point at actions not focusing on appearance, clothes, scenery, etc. In turn, S subjects provided more or less detailed description of the picker, and also briefly characterized appearance of other characters.

FO values are consistent with this observation. In contrast with S subjects, CH subjects confused not only pears and apples, but also, and much more often, they confused age ('man' instead of 'boy') and gender ('boy' and even 'man' instead of 'girl') of the characters.

TS, FA and FC values points to notable difficulties in representing causal chain of the narrative. TS values show that two, in average, basic scenes get lost in 'pear stories' of preschool-aged children. This means that the story is often broken up into independent fragments which are linked with the conjunction 'then'. To be more precise, a majority of CH subjects missed the episode with a goat, which does not 'work' later on in the film (only 8 subjects from 50 remembered this), many of them missed also the girl on a bike approaching the boy, and sometimes the final scene was missed as well. Also, almost in all stories of CH subjects there were some ambiguities in reference because their use of pronouns sometimes did not allow determine a subject correctly.

Data for EC are consistent with that point. S subjects often used dependent words (mainly, 'who', 'which', but also 'when', 'where', 'what', 'why', etc.) in order to clarify reference. If there are some objects with the same nomination (e.g., 'boy'), exploiting of such constructions is useful tool for reference clarification. Meanwhile, CH participants can hardly use this tool.

Let us proceed to exploring some correlations within CH group. First of all, there is a positive correlation between the age of participants (AP) and TW, TI, TD and a negative correlation between the age of participants and FA, FO, FC. However, only the correlation between AP and TW; AP and FO are significant (r(AP, TW) = 0.35, r(AP, FO) = -0.27, $p<0.05$; r(AP, TI) = 0.14, r(AP, TD) = 0.23, r(AP, FA) = -0.25, r(AP, FC) = -0.13).

In the meantime, there is a significant positive correlation between TW and TI, TW and TD, and also a significant negative correlation between TW and FA, TW and FC, TW and FO (r(TW, FA)=-0.44, r(TW, FC)= -0.46, $p<0.01$; r(TW, TI)= 0,34, r(TW, TD)=0.33, r(TW, FO) = -0,29, $p<0.05$). This gives some evidence for the point that all narrative skills represented by the variables of the subset A develop consistently.

In order to complete the spectrum of problems CH subjects encountered it is worth noting that ten of them (20%) were not able to retell the pear film on their own, and the experimenters were made to help them with leading questions.

B. As mentioned, spontaneous movements were in focus of our interests. We singled out three general types of body movements according to body parts which provide them: hand movements (HM), leg movements (LM), torso movements (TM). Also for hands and legs we distinguished implicit movements (e.g., slight finger movements) and explicit movements (e.g., open movements of the whole hand). So, we used five combinations: IHM, EHM, ILM, ELM, TM. We measured the total time of each kind of movement in ratio to the time of the whole story presented in percent. The results are expressed in Table 3.

Table 3. Mean IHM, EHM, ILM, ELM, TM for CH and S

	IHM	EHM	ILM
CH	31.9±22.2	5.5±10.1	7.0±11.6
S	20.0±21.4	0.2±0.8	4.6±9.6
	ELM	**TM**	**Σ**
CH	6.9±16.9	15.7±17.3	65.8±18.2
S	0	0.6±1.1	24.5±21.1

As can be seen from Table 3, there is a significant difference in performing spontaneous movements during the retelling between CH and S groups (the use of one-way ANOVA to compare Σ for these groups gives $p<0.001$). CH subjects perform such movements during over a half-time period of the retelling, and over a quarter-time period of the retelling the movements are explicit. The spectrum of their movements is really wide: kids put their hands under the legs, fidget in their seats, lift their legs up to their mouths, etc. All this almost totally disappear in retellings of S subjects. The only spontaneous movements they perform are implicit hand movements such as to finger over and, to some extent, implicit leg movements. Other types of movements are extremely rare.

Importantly, there is no significant correlation between Σ (the sum of IHM, EHM, ILM, ELM, TM) and TW for CH subjects (r=-0.14). This can be interpreted as some evidence against the conjecture that narrative skills and body experience in discourse develop coherently.

The picture of gestures for CH and S groups is strictly opposite. Only 8 from 50 (16%) CH subjects exploited gestures as a more or less important tool in communication. At the same time, almost all S subjects resorted to the permanent use of gestures during their retellings. The total time of gesture performance in ratio to the time of the whole story presented in percent is 2.4±5.2 for CH subjects and 68.5±23.7 for S subjects ($p<0.001$).

Addressing again S subjects who retold the pear story to the school principal, it is worthwhile to note that they performed less gestures and more spontaneous movements than their peers but this difference cannot change the picture drawn above.

C. The last group of parameters we worked out is concerned with discourse words, pauses and an EDU length. We measured the total number of discourse words in ratio to TW (DW, %), the total length of pauses in ratio to the time of the whole story (LP, %)[1], and a mean EDU length (EDUL, words). The data are presented in Table 4.

Table 4. Mean DW, LP, EDUL for CH and S

	DW	LP	EDUL
CH	3.0±2.0	38.2±11.2	3.2±0.5
S	4.1±3.1	25.3±10.4	4.2±0.6

These data give clear evidence that CH subjects in comparison with S ones are less skillful in filling pauses in communication ($p<0.001$). Also it is worthwhile to point at more extensive EDU for S subjects ($p<0.001$).The difference between DW for CH subjects and S subjects is not significant.

Importantly, there is significant positive correlation between TW and DW for CH subjects (r (TW, DW) = 0,32, $p<0.05$). Meanwhile, the correlation between TW and LP and between TW and EDUL is not significant (r (TW, LP) =-0,23; r (TW, EDUL) = -0,02).

Discussion

The results of the experiment support the basic hypothesis of significant obstacles which preschool-aged children encounter when acquiring the discourse of retelling story in formal situation. In the experiment three basic components of this discourse were examined: a logical structure and a coherence of the narrative; gestures and spontaneous movements lost any communicative meaning; and EDU, discourse words and pauses. In all these components CH subjects experienced more or less serious difficulties in comparison with a control group presented by high school students. Furthermore, the

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[1] Only 37 from 50 recordings were valid for the pause measuring.

experiment provided some evidence that these components are acquired coherently, that is, the progress in one component correlates with positive shifts in others.

It is worth classifying the problems CH subjects face and cognitive skills behind these problems. Two basic domains can be picked out in "The Pear Film" retelling discourse. The first one is concerned with the 'content' of the discourse (to make sense of the story and to present this correctly in speech), the second one – with 'right' mode of communicative behavior. Cognitive skills behind the first domain can be also divided into two parts. The first part is based on situated cognition. A lack of practical knowledge entails increasing FO value which characterizes flaws in recognizing particular objects (as mentioned, kids confused pears with apples, goat with caw, girl with boy, boy with man, etc.) The second set of problems points at an inability to figure out a causal chain of events and to represent this chain in the retelling. In consistency with Sedov's (2004) results our data show that a majority of CH subjects in their retellings get plunged into the stream of events, and they are unable to change the perspective and to look at the story from the bird's eye view. This also determines their view of an addressee. They usually take for granted that an addressee is also familiar with all details of the story and he can easily reconstruct those following restrained comments of a storyteller. TS, TI, FA, and FC values characterize this issue.

CH subjects have also obvious problems with the use of language. "The Pear Film" retelling as a kind of discourse is close to writing, and writing skills are widely used by S subjects in their retellings. More or less consciously, they rest on texts studied at school as a paradigm for 'pear stories' they make up. CH subjects have no such experience. An influence of literacy on their retellings is trifling, if it is at all. As a result, their language is extremely poor, with minimum of extended and subordinate constructions. TC value is responsible for this set of factors.

The 'communicative' domain of the discourse is characterized by values of variables which constitute subsets B and C. In particular, LHM, EHM, LLM, ELM, and TM values point at a flaw in discourse competence connected with some lack of body control in communication.

Although three sets of factors presented above address different cognitive domains and function more or less independently, there is some coherence in their development (e.g., significant positive correlation between TW and DW give some evidence for such coherence).

Also LHM, EHM, LLM, ELM, TM data need more detailed commentary. This sounds nowadays as a common point that body movements in discourse have nothing but communicative function. Nevertheless, this is not so for kids. Again, the behavior of CH subjects gives robust evidence that they not only think with their brains and speak with their tongues, but they also think and speak with their bodies. The spontaneous movements which they perform intensively during the retelling are not directed to their interlocutors, but these movements do rather produce, as it were, 'nutrient medium' for the process of speaking. Their speech is a vivid and striking illustration

of theoretical postulates of embodiment theory (Barsalou 1999; Krois 2007; Barsalou 2010).

Finally, we venture to make a conjecture in this scope. The comparison of communicative models of CH and S subjects indicates a substantial shift from spontaneous movements to gestures. This shift is likely to be consistent with Vygotsky's (1986) theory of inner speech. According to Vygotsky, cognitive development in ontogeny is concerned with the transition from egocentric speech to inner speech which cognitive function is to mediate between speech and thought. From this perspective, inner speech is interpreted as interiorization of egocentric speech. Similarly, implicit spontaneous movements can be treated as interiorization of explicit spontaneous movements. Such interiorization comes to the end in thought which includes words and movements in a 'converted' mode similarly to how synthesis includes thesis and antithesis in Hegel's philosophy. On the opposite stage, thought deploys into a communicative utterance directed to an addressee and formed by words, gestures, prosody and other elements of multimodal communication. In this scope, gestures not just accompany words in communication, but rather they are equally meaningful element of communicative behavior.

Another possible domain to apply the results of our research is the theory of origin of language developed by Tomasello and colleagues. As mentioned, they point at gestures as at an important predecessor of vocal communication, but they do not take into account spontaneous movements. A precise analysis of spontaneous movements of children and great apes might shed new light on this issue.

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