

World knowledge and language devices

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The starting point of the investigation I am going to briefly outline was the pedagogical practice. The implementation of the results of the investigation is pedagogical practice too. The bridge between the start and the finish is psychology.

While teaching L2 (German) I was astonished of the incongruence between the efforts and the results when the goal was to teach students to read scientific literature. The formal means of the language that express the general grammatical categories and the connections between the words in the sentence turn out to be what may be called learn-resistant.

Moreover, according to the data of a Russian author (Sinev, 1987) the post-graduate students after a special traditional training in reading scientific literature sometimes make *more* mistakes than in the beginning.

TABLE1. Mistakes made by the post graduate students in the beginning and at the end of a 70-hours traditional course of the LSP (German)

Examples of Mistakes	before and after the course, %	
	before	after
Taking the preposition <i>um</i> for a conjugation	90	60
Taking the article <i>der</i> at the beginning of a clause for nom. mask. instead for dat. fem.	68	64
Taking the conjugation <i>die</i> for an article at the beginning of a dependent clause	61	64
Taking the past participle for a finite verb in the participle clause (sentences without auxiliary verbs)	51	56
Taking the past participle for a finite verb in the participle clause (sentences with an auxiliary verbs)	50	75

It was clear that some deep cause might lie behind it. This unknown something had to be found and I felt it necessary to step onto the bridge I mentioned above: to try and find the cause in the peculiarities of the functioning of the brain.

The idea was as follows: as reading is one of the kinds of processing information, it must possess the main features of processing information in general.

There is one trait in this process that deserves a special attention. The result of processing information is the sum of two components: the data received by the sensory channels and the background knowledge of the world stored in mind. To be more exact – of probabilities of events in reality.

But when there are two channels of processing information, the problem arises whether their influence on the output is equal or whether one of them is stronger.

As to the processing of the non-verbal information, the experiments with the glasses turning things upside-down (invertoscopes) can be regarded as an answer. They testify to the fact that the model of the world with its probabilistic regularities is stronger than the data received on line. So, having an invertoscope on, the subject sees a torch with its wick down. But the moment the wick is burnt on, it dashes upwards: according to the experience of humans, the flame cannot be under the burning object.

The question suggests itself whether the same holds for processing *verbal* information. So far it has only been shown that background knowledge does play a certain role in processing sentences. For example, ambiguous utterances are understood according to the probability of the events they describe a sentence like

The bird saw a birdwatcher with binoculars

is comprehended in the way that it is the birdwatcher who uses the instrument and not the bird (McClelland et al, 1989).

But the question I posed is of another kind: that is the question of comparison of the relative role the background knowledge and the information received on line play in the final result of processing information. It was rather hard to solve the problem. A situation guaranteeing "a fight" between the two components of the comprehension process had to be created. I made it in the following way.

An experiment was devised which may be called a linguistic invertoscope. I chose some sentences describing events whose probability in reality practically equals 1, some very simple scripts like:

In the restaurant, the waiter brought the guest beefsteak

In the steet, a girl helped an old woman to carry the bag,

and the like.

In these sentences I inverted the actants:

In the restaurant, the guest brought the waiter beefsteak

In the steet, an old woman helped a girl to carry the bag,

and so on.

The probability of such events is in the vicinity of zero. And the knowledge of the probability of the events gained the victory over the syntactic structure, over the devices of language. (It must be added that the experiment was carried out in Russian, a highly inflexional language, where not only the word order but also the endings of the nouns determine the actor). The overwhelming majority of the subjects re-inverted the relations between the actants. In their interpretation it was the waiter who brought the beefsteak and the girl who carried the bag and so on.

The fact that some of the subjects still gave the correct version, that is the version they received on line most likely can be explained through the mobilization of attention under the conditions of the experiment. If the sentences were mentioned when I was speaking to scientists about my other experiments, no one noticed the trap. Among those who were trapped was the dean of the Faculty of Psychology of the University (it proves that deans are normal humans too).

Thus, I have got the proof that processing *verbal* information obeys the same laws that are true for other kinds of this process. That is: the information received on line is weaker than the fragments of the model of the world that are stored in mind.

Two inferences can be drawn from the results of the experiment.

The one is of pure theoretical, or rather philosophical nature. It testifies to the borders of human cognitive possibilities and hence to some extent to agnosticism. The sensoric picture of the world is not identical to the world itself. The information that does not correspond to the *a priori* constructions of the mind is blocked and the image of the world *hic et nunc* is distorted.

The other inference is on the contrary of an absolutely other, that is, of pragmatic nature. It is the answer to the problem I formulated in the beginning of the report. Now it is clear why do the students apply a guessing strategy while reading scientific literature, why do they ignore the formal means of the language which express the connections between the words in the sentence. They simply do not notice these grammatical means and create a probable picture of what is conveyed through the meanings of the words. When they have to do with the sentences describing everyday life their guessing strategy as a rule coincides with what is described in the utterance. Indeed: "The boy plays football" and not "The football plays the boy". But a scientific work deals with something unknown, its world is the world *in statu nascendi* and the guessing strategy proves to be completely inadequate.

Thus, a foreign language teacher faces an immensely difficult problem. The teacher has to fight against one of the fundamental laws of cognition.

That is why the results of teaching this kind of the LSP are so unsatisfactory. And there seems to be no way out.

But there is one.

One can create a description of the system of language as an analysis of the formal means as such: through comparing their qualities and their power to express grammatical meanings. I call it «paradigmatics in syntagmatics». To create such a description one needs a special notion that I call «informative power of grammatical means». By such presentation of grammatical means it becomes possible to find dozens of various kinds of tasks (without root morphemes, so that the guessing strategy is excluded). The solving of such tasks demonstrates to the students the importance of the formal means for comprehending a sentence and guarantees their mastering.

TABLE 2. Mistakes made by the post graduate students in the beginning and at the end of our 70-hours course of the LSP (German)

Examples of Mistakes	before and after the course, %	
	before	after
Taking the preposition <i>um</i> for a conjugation	75	0
Taking the article <i>der</i> at the beginning of a clause for nom. mask. instead for dat. fem.	67	2
Taking the conjugation <i>die</i> for an article at the beginning of a dependent clause	64	6
Taking the past participle for a finite verb in the participle clause (sentences without auxiliary verbs)	57	0
Taking the past participle for a finite verb in the participle clause (sentences with an auxiliary verbs)	38	1

But the description of how to present the system of language in such a way and what kind of tasks must be devised to attain the goal is another story and quite a long one.

Fig 1. Mistakes made by the post graduate students in the beginning and at the end of a 70-hours traditional course of the LSP (German)

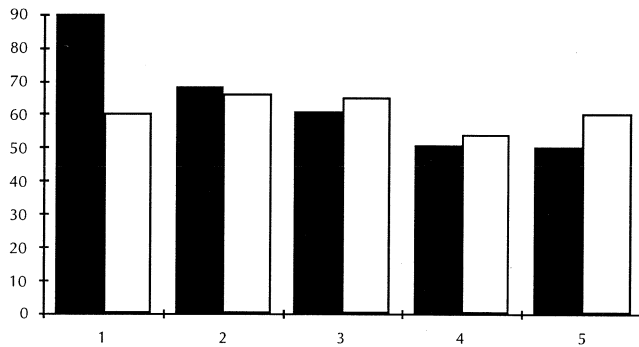
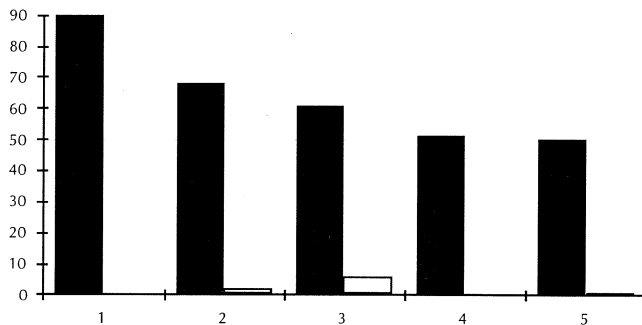


Fig 2. Mistakes made by the post graduate students in the beginning and at the end of our 70-hours course of the LSP (German).



Note. Figures 1 and 2 correspond to the Tables 1 and 2 given in the text.

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