Spoken Discourse and Perceptual Rules of its Semantic Reconstruction

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Abstract

The paper is about the research on possibilities of modelling prosodic-semantic-pragmatic variability of spoken discourse. The experiments were carried out on the material of German, Russian and English. The main objective of the research is to detect interdependence between prosodic organisation and linguistic structure of the utterance as far as phonetic, phonological, lexical, syntactical, semantic aspects are concerned. Reconstruction of the spoken discourse in English, Russian, German let us develop a range of models of discourse and single out factors which determine variability of phonetic, prosodic, semantic and pragmatic features. This is a key to understanding the procedure of multi-channel processing of human speech in the environment of complicated communication which involves a wide gamut of components which are to be taken into consideration while structuring and restructuring spoken discourse. As a part of the project a phonetic base of Russian, German and English authentic speech was built. The base (corpus of spoken speech samples) includes utterances representing various types of spoken discourse applicable to a certain subject domain. While building the corpus the factor of contact / distant communication were taken into account. All the samples were transcribed and labeled. As a result some features were singled out on prosodic and semantic levels which were used by the listeners involved into experiments on discourse reconstruction. The most frequently employed features were the following: integral semantic content of the utterances, melodic curve of the utterance, stress and accent of certain syllables. Loudness was named as the least frequently employed feature to draw conclusion regarding reconstruction of the semantic content of the utterance. The rest of the features, description of the experiments and the methodology of the experiments and statistical analysis of the obtained data are presented in the full version of the paper.

Discussion

The research foresees both an analysis and modelling prosodic-semantic-pragmatic variability of spoken discourse. For the first time perceptual acoustic experiments based on spoken discourse were carried out on the material of three languages the German, English and Russian languages involving native speakers and basing on their linguistic consciousness. Different aspects of linguistic mechanism of spoken speech sense decoding in discourse with due regard to such forms of spoken activity as a dialogue, “trilogue”, “polylogue”) are used. Investigated during the research are authentic discourse materials of contact (in direct communication) and distant (with the help of a telephone channel) devices and new information technologies types of verbal communication.

For the first time the work sets the task the solution of which will enable us on the material of different languages to bring to light a dependence mechanism between prosodic arrangement of a spoken phrase in discourse, on the one hand, and signs of a multicomponent linguistic structure (the structure can be phonemic-phonetic, segment-suprasegment, lexical, syntactical-semantic, pragmatic), on the other.

The developed models as well as the analysis of the factors causing a phonetic-prosodic-semantic-pragmatic variability of verbal speech reaction of the addressee and the addresser within discourse, bringing to light the deep mechanism of speech invariants and variants functioning in the process of generating them in different languages are not only of scientific interest themselves. They are also the key to the understanding of the process of multi-channel processing of speech information by human being on the basis of spoken discourse in more sophisticated multi-component communication conditions.

- During the research the formation of a phonetic base of the Russian, English and German speech including the authentic spoken material with different types of spoken discourse applying to the chosen subject area and with regard to communicators’ contact and distance factors is carried out.

- Within the research classification of the chosen samples of spoken discourse is realized on the basis of integrality, completion, compliance with the norms of discourse building, the number of participants, the number of replies and realized themes, configuration changes of communicants’ interaction. Certification of spoken discourse samples was carried out with regard to the following parameters: semantic completeness, the number of discourse participants, and the number of remarks of the topic content. The spoken
material during the research was presented in written form, transcribed and assigned.

- At the outset of the research perceptual acoustical experiments were carried out. The aim was to find out and evaluate different attributes (linguistic and extra linguistic) that condition prosodic-semantic variation of discourse components. The experiments covered:
  - evaluation of the “success” factor in the achievements of a communicative goal subject to the hierarchy of prosodic-semantic attributes of spoken discourse realization;
  - an “active” experiment the essence of which is an artificial “abruption” of one of spoken discourse components (a remark-stimulus and a remark-reaction) with the subsequent aim of a problem of forecasting compensation of a prosodic-semantic discourse structure
  - mathematical-statistical data processing
- To define the role of prosodic characteristics (melodics, dynamics, tempo, and also accent details) in perceiving remark-stimuli and remark-reactions special perceptive acoustic experiments allowing to point out and evaluate those linguistic attributes that condition prosodic-semantic variation of discourse components were carried out.
- A special procedure of informants’ questioning preceded the experiment. Discourse remarks were grouped in pairs (remark-stimuli and remark-reactions) that had different degrees of semantic connection. The experiment included:
  a) restoration of a remark-reaction based on the given remark-stimulus
  b) restoration of a remark-stimulus based on a remark-reaction
  c) determination of linguistic features that allow restoring one of the demanded remarks (integrative semantic content of a statement, a word or a word combination, prosodic features – melodics, loudness, tempo, accent and other features additionally pointed out by the informants.
- A database was made for each analyzed language as a result of the perceptive-acoustic experiment. This database permits to get different types of information (information about the participants both with regard to socio-linguistic parameters and given variants of answers).
- Different household dialogues were used applicable to the Russian language as an experimental material of discourse realization. The specificity was in the fact that in the aspect of goal stating dialogues could be characterized by the author’s purpose with a psychological emotional and intentional dominant and with an idea of a socio-practical dominant. A group of informants participated in the experiment (n=41). A number of fragments (n=31) were chosen from all the experimental material that include both a remark-stimulus and a remark-reaction.
- The analysis of the results received on the basis of the Russian Language shows that remark-reactions of the informants to the given remark-stimuli basically belong to one semantic field, however they may be placed with a different degree of remoteness from its semantic center.
- The informants used all the features suggested by researches as decision making criteria. The number of marked features fluctuated from 1-5 in different participants. Every informant oriented himself on an individual preferential range of attributes differing both in quantity and quality.
- Among basic principles marked by the informants and allowing to restore the semantic content of the whole statement, the most frequent is the integrative semantic content of the statement. As for melodics as well as stress are mentioned most frequently. Loudness as a decision making feature in making a decision is used least frequently. Attributes connected with semantic components comprise 49.0 % - 50.7%, prosodic ones – 44.3% - 50.7%. There are some differences in the frequency of the used attributes depending on the material presentation sequence (a remark-stimulus or a remark-reaction). The share of semantic components becomes about 10% less when a remark-stimulus is restored on the basis of a remark-reaction, consequently the share of prosodic features (especially stress) increases. A slight increase in the role of tempo and loudness is pointed out. Thus the correlation between semantic and prosodic features changes (from 55.0% - 44.3% while listening to remark-stimuli and up to 49.0% - 50.7% while listening to remark-reactions).
- Applicable to the English language the analysis of the received results shows the exact restoration of a remark-stimulus and a remark-reaction occurred by the informants very seldom, however the answers very close to the original were given in 40% of the cases. Besides the answers close to the original comprised about 40% and the answers remained within the semantic field and the restored remarks (stimuli and reactions) on the periphery or beyond the semantic field comprised 10-15%.
- Attributes marked by the informants in making a decision, as the leading ones were the following: integrative semantic content of a statement as well as integrative semantic content of a statement and
melodics. The informants pointed out loudness most rarely. There is a combination of three components (integrative semantic content of a statement, melodics and stress and also both the first and the second ones out of the above features and tempo). While taking a decision in 75% of the cases the informants chose the integrative semantic content of the statement and also prosodic features (melodics and stress) as the leading ones.

- Fragments (remark-stimuli and remark-reactions) of authentic polylogue were used as the research material for the German language. The analysis of the received data based on the features that are used in a decision making process concerning the restoration of a remark-stimulus and a remark-reaction allowed stating the following: the informants marked both “integrative semantic content of a statement” and “a word or a word combination” most frequently.

- Among prosodic parameters melodics and stress turned out to be the most frequent ones. Tempo and loudness come across least frequently. The experiment has revealed the presence of some differences between two groups of the informants on all the features set. The informants also noted a positive influence on the restoration on the basis of acoustic perception of a remark-stimulus and a remark-reaction of hesitation pauses.

- Mathematical statistics was used to precede all the data. For instance, on the material of the German language the following results were received: the general number of answers in restoration remark-reactions with regard to the “integrative semantic content of the statement” was - 56.7%, “a word or a word combination” - 66.3%, “melodics”- 65.3%, “stress”- 68.2%. The total number of answers in restoration a remark-stimulus based on the “integrative semantic content of a statement” was 66.3%, “a word or a word combination” principle – 66.8%, “melodics” – 58.3%, “stress” – 62.5%.

- The preliminary results received in the course of the research can help to make a new hypothesis. According to it the process of spoken semantic discourse is realized at some levels hierarchically and a difficult analytic-synthetic method of speech interpretation is expected. Both semantic and prosodic information is used in the speech interpretation process.

- On the whole the carried out experiment based on the restoration of a remark-reaction using a remark-stimulus and vice versa allowed to confirm the hypothesis according to which in a similar restoration the informants appeal above all to semantic features. However the informants use prosodic features too. Such a tendency is characteristic of the analyzed languages.

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**References**