TO SPECIFICITY OF DISCOURSE APPROACH FOR ENGINEERING STUDENTS LISTENING COMPREHENSION TRAINING IN ELT CLASSROOM

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Abstract. Spoken English listening comprehension has become mandatory in the fields of science and technology. The innovations in higher education require a high level of students' English listening comprehension because of the increased amount of lectures on special subjects delivered in English. However, of the four skills (reading, writing, listening and speaking) listening is the least researched and valued. Problems in listening require new approaches resulting in developing special educational strategies. The article is aimed at discussing the relevant prosody and intonation markers in the speech of a lecturer as additional aids to understand the content of the oral scientific discourse. The following indicators have been chosen by the authors of the article as the most observable means of the speaker's intention to convey the message: the tone change at the beginning of a new paragraph; emphasizing the key words and word-combinations; intonation changes to transfer the known and new information. The tests examining the students' abilities to recognize the prosody and intonation features in the oral scientific discourse were performed. Students' training was organized to study the ways of listening comprehension improvement, and positive results were received. The article underlines the importance of teaching students to know the role of prosody and intonation as supplementary aids of understanding the meaning. Teaching methods, the instruments for objective visualization of intonation markers and creation of visual training materials are introduced in the article.

Keywords: English teaching, engineering students, listening comprehension, oral scientific discourse, pragmatic approach, stress and intonation markers, visualization.

Introduction

A special approach to language as an integral part of cognition allows considering its existence in specific communicative situations. This approach encompasses the search for the correlation between cognitive and linguistic structures. It contributes to a better understanding of the links between language and consciousness, speech and thinking. With the development of discourse linguistics an interest increased to the factors determining the choice of a particular speaker' prosodic and intonation pattern. Though a lot of researchers consider the sentence prosody to be determined by communicative goals rather than by formal rules, recognition of prosody and intonation to be an additional means to express the speaker's intention has been disputed by some scholars. At the same time, L. R. Zinder opposed the subjective nature of intonation. He wrote, that "… to deny the importance of linguistic intonation is impossible, since it is contrary to the objective state of affairs. If the melody were subjective, it would be incomprehensible. If we understand it, then we associate with it a certain sense, hence, it has certain linguistic meaning" [1]. Discursive approach to languages is based on the assertion that all language levels, including prosody and intonation, carry the information about human beings' mental activity processes.

The purpose of the article is to study the perception of several oral scientific discourse prosodic features by the students of engineering specialties. These are the prosodic features of a paragraph as a group of related sentences discussing one main idea; prosodic marking out the key words and word combinations reflecting the core meaning of the text; co-occurrence of the word prominence marked by a system of tones.

The authors confine to the opinion that these features aim to promote an additional help to the oral scientific discourse listening comprehension. The main feature of these three parameters is phonetic separability, and that is why they are unified for the research.

Materials and methods of the experiment

Experiment background

The unity of a paragraph is achieved by the involvement of every sentence in direct explanation of the main idea. A paragraph discusses one idea, and when the speaker expresses a new thought, he begins a new paragraph. It is often considered that the meaning of a paragraph relates to the composition of a written text, while the oral discourse is a combination of an utterance-length unity

[2]. However, the notion of a paragraph is applicable to a lecture discussing scientific issues, because its structure is traditionally associated with the written scientific discourse. The intonation of the oral discourse serves as a means of the text segmentation into paragraphs due to range and register on the phonetic level (prosodic features). The first syntagma as an elementary constituent of the paragraph is pronounced in a broader register than the successive ones. The beginning of the paragraph has a higher level of the voice range, and it is characterized by voice loudness. Changing the intonation is followed by a pause after the end of the paragraph and the beginning of the other one [2; 3]. The listeners are able to comprehend this feature.

The key words have been studied in phonosemantic research for different purposes. They are considered to be meaningful units of the text. The usage of the key words in the oral scientific discourse is principally determined by the intention of the speaker to underline the most important aspects of the utterance. Marking out the key words by means of prosody can be considered to be the realization of rational and emotional appeal to the sense of listeners. Being mostly nouns, the emphasized words are placed usually at the end of the intonation phrase. However, nuclear focus may move within the intonation group depending on the intention of the speaker [3].

The idea that the prosody and intonation help explain the meaning was stated by D. Brazil at the end of the 20-th century. The two tones: the falling and the falling-rising are thought about by the scientist to be the most frequent. They embody the basic meaning distinction carried out by the tone. The function of the falling-rising tone is to mark a "…common ground", "common involvement" in a particular ongoing interaction up to the moment of utterance…". The function of the falling tone is "proclaiming", which means making the information known to the people. D. Brazil also points to the additional, rising-falling tone, marked "p+", which presents the known information, or the information considered to be a part of the common knowledge of the speaker and listener. Its usage is explained by the dominant position of the speaker [4]. The choice of the rising tone is discussed by C. Gussenhoven. The usage of this tone presumes the presence of the information as the content knowledge of the interlocutors, and it underlines the dominant position of the speaker either [5]. The choice of "p+" and "r+" for the experiment is explained by their frequency in the lecturers' speech.

The description of the tones in the middle of the 20-th century was based mainly on the following expressions: "certainty", "completeness", "independence"; "uncertain", "incomplete", "dependent" "assertive"[6-9]. The same principle of characterizing the intonation is often present in modern textbooks of phonetics. These definitions can be considered to be too descriptive and they are not aimed at reflecting the speaker's intentions. Only meaningful parameters have to be included into the description of the intonation system of any language [2]. The attempts made by D. Brazil and C. Gussenhoven to associate the tone usage with contrastive meaningful categories represent a move towards a better discourse perception.

Experimental group

The participants were two groups of the first grade students, who had demonstrated comparatively equal results of listening comprehension. They were asked to rate their English language ability for each of the four skills: reading, writing, listening, and speaking. In total, 42 students of engineering specialties responded to the query. They assessed themselves on a 5-point scale ranging from "excellent" to "unable". According to the diagram, the listening skills received the lowest estimation, while the reading skills demonstrated the highest "good" bar (Fig. 1).
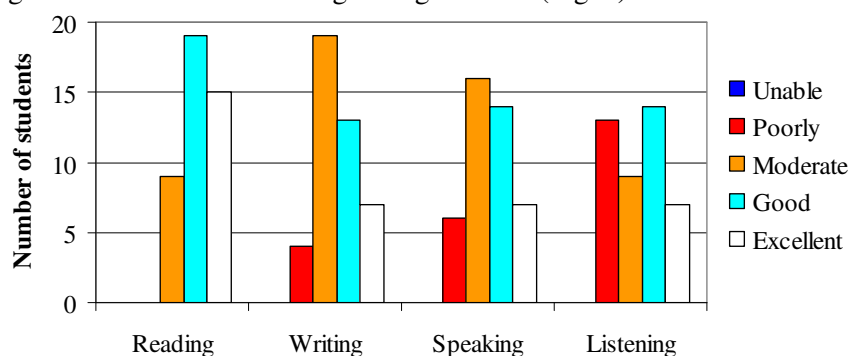

Fig. 1. **Experimental group language skills self-assessment**

The first group was to perform the listening tasks, and the results were statistically measured. The second group had been trained beforehand to comprehend the meaningful prosody features. Then it was offered the same test, and the results were also statistically measured (Tables 1, 2).

Listening content

Listening material presents two authentic sources: the speech samples chosen from a scientific lecture and from a popular scientific movie.

At the first stage of the experiment 5 audio fragments of the scientific lecture "The Great Ideas of Computer Science", delivered at the Cambridge University by Chris Bishop (Microsoft Research) in 2014, were chosen [10]. Its content presents new information and is appropriate in terms of the language level. The lecture material does not require a special scientific background. The lecture contains the material delivered to the students' audience in an energetic and lively manner.

The popular scientific movie "The Agatha Christie Code" was selected as the other listening material. It tells about the application of the computer program "Concordance" to the research of Agatha Christie's writing style [11]. The students have the content knowledge, because the author is known to them. In the movie there are a lot of people speaking, who demonstrate the expressiveness of the narration making the contrastive tones appreciable. It does not present any special terminology, which can be a keyto the content understanding.

Experiment methodology

The experiment was carried out:

1. To determine the ability of the engineering students in the Bachelor's program to comprehend the oral scientific discourse;
2. To validate the significance of teaching prosody and intonation as additional means of listening comprehension.

Listening of the lecture was directed to examine the cognitive strategy of the students aimed at understanding the target ideas of the scientific lecture. The students were offered 5 audio fragments being 2 minutes long each. The questions were of "multiple choice" form assessment. The students were asked to select the best possible answer from the choices out of the list. The questions were of three levels of complexity: * choose the direct answer; ** make choice between the optional statements; *** infer a logical conclusion and make choice.

The purpose of listening to the movie fragments was to investigate the students' ability of relevant content comprehension. The teachers were to form a judgment about the students' ability to recognize prosody and intonation indicators. The students were asked to divide the text into paragraphs according to the transition signals and answer the questions, which were put to uncover the content of each paragraph. They were to write out the key words and to restore the content of the text using the key words written out. The students were asked to determine the direction of the intonation in the offered sentences and to define if the speakers referred to the already discussed issues or if they considered the topic to be quite new to the listeners. The samples of the activities are given below:

Activity one. The students were asked to divide the text into paragraphs while listening to it. They had to write down the first word of the new paragraph. Here is a part of the text to analyze:

Buried here, in a quite unassuming corner, is a writer who within her lifetime achieved unimaginable fame. She sold a staggering two point three hundred billion books. Second only to Shakespeare, she is the most widely published author of all times. Her name is Agatha Mary Clarissa Mallowan better known to us as Agatha Christie. The secret of Agatha's success is hidden, of course, not in a grave at all, but in her writing. It's a secret that stares us in a face every time we open one of her books. We just can't see it. So the search begins.

Activity two. The students were asked to answer the questions, presented to them in a written form:

1. How many paragraphs does this text have?
2. What made you decide how many paragraphs are therein the abstract (the content of the utterance; the changes of the reader's voice)?
3. Is the discussed writer famous or not?
4. Where is the secret of the writer hidden?

Activity three. The students were asked to listen to the oral text and to write out the key words according to their choice while listening to the text:

A unique research unit has been gathered from several universities around England. They will use a specially designed system of linked high speed computer programs. One of these programs is known as Concordance, a 21-st century version of an ancient code breaking science. It was a science that began in the Middle Ages when theological scholars started to look at the Bible in a novel way. They were hoping to achieve a greater understanding of the mysteries believed to be hidden in its passages by looking to patterns, messages, codes, mortal techniques to help them read the word of God. To do this they had to create the way of studying groups of words to reveal secrets invisible to the naked eye.

Activity four. The students were asked to restore the text according to the key words they had written out and to write down their variant.

Activity five. The students were asked to demonstrate the direction of the intonation of some words (marked by gaps) in the sentences they listened to. They were to come to the conclusion, if these words expressed known or new information. The following and similar examples were used to check the students' abilities to recognize the meaning of the intonation:

1. Second only to Shakespeare, she is the most widely published author of all times;
2. This _invention was to become one of the most powerful computer systems in the world.

The PRAAT Phonetics Software Package Program is known to study the prosody and intonation [12]. Its facilities to demonstrate the tone usage in the oral scientific discourse were used. To avoid mistakes in determining the direction of the intonation, the PRAAT Phonetics Software Package Program was used to test the tones in the offered sentences.

Training

The training process included: a)explanation of the discourse function of the prosody and intonation to mark the prominence, the newsworthiness of the information; b)demonstration of the speech patterns and comments on the lecturer's intention to use special prosody and intonation markers.The following and similar examples were chosen for the illustration of the prosody and intonation features connected with respect to meaning.

1. Paragraphs division.The fragment taken from the movie demonstrates the speech pattern of the scientist analyzing the writer's style:*"…The research shows that Agatha actually repeats words at least three times in a particular paragraph. It's what we call the metaprogram and is particularly what metaprogram enables us to become convinced about something.*[New paragraph]*So in this particular paragraph we have the word "remembering, remembrance, remember that feels our convincer, that we are absolutely convinced in our paragraph that it is about remembering things…".*

The change of the tone pitch of the speaker, which makes his voice sound louder, pronouncing *"So in this paragraph…"* helps the listeners to understand, that the speaker shifts from the description of the abilities of the program to the description of the writer's style.

2. Key words and word combinations. The following movie fragment shows that the words, the speaker distinguishes, help the listener not only understand the content, but also restore it. Here is the example of the scientist's speech:*"…What we are finding in Agatha's work is a level of repetition of key concepts in almost like clouds of words where words occur in a condensed space and related to each other heavily across very small spaces. So, for example, here she is thinking about life. And the word "life" and what's the analogous to life occur repeatedly:"…life, life, death, life, life". There is an idea of instinct to live:"…one doesn't live, reason assents to living...".*

The key words and word combinations: "finding, work, key concepts, clouds of words, condensed space, related, across, life, analogous to life, repeatedly, instinct to live" represent the content of the paragraph in a concentrated form.

3. Intonation patterns. For training to distinguish the into nation patterns the authors chose the sentences from the scientific lecture. The falling tone is mainly used as the indication of the prominent information; the falling-rising tone is used to underline that the information must be already known to the audience or mentioned by the speakers before; the rising and the rising-falling tone are used to show the dominant position of the lecturer in explaining the material to the students. The fact that

these four types of tones are widely used by the lecturer was confirmed by the application of the PRAAT program.

This is an example of the sentence, where the lecturer first refers to the already known information and then introduces a new concept: *So computer science is not the same thing* [falling-raising tone] *as* [falling tone] *ICT* (Fig. 2).
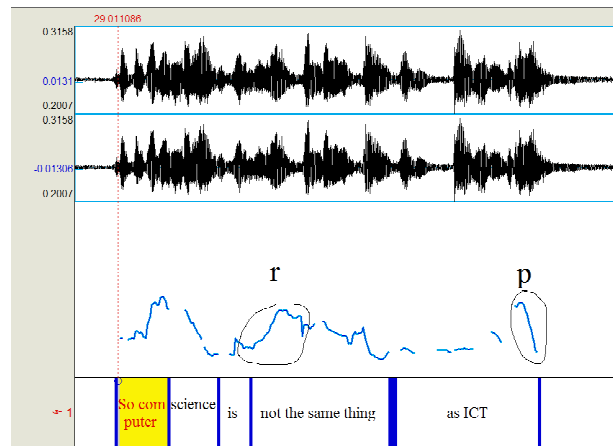

Fig. 2. **Sentence sample referring to the already known (r) and proclaiming a new concept (p)**

4.   In this sentence the lecturer uses the rising tone to refer to the past,the rising-falling tone to introduce a new idea and, moreover, hewants the audience to understand its importance: *It's really* [rising tone] *about the* [rising-falling tone] *ideas that make computing possible* (Fig. 3).
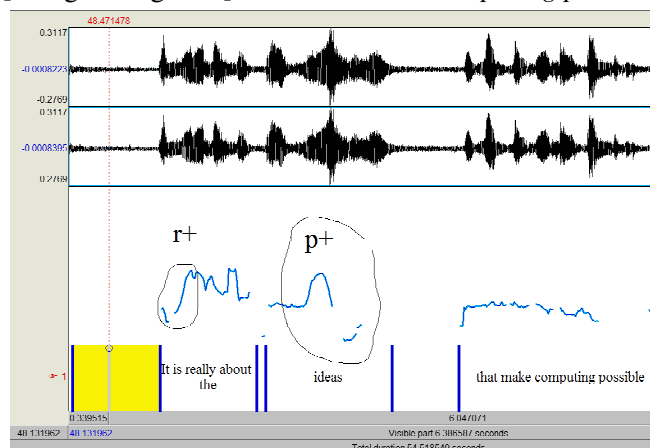

Fig. 3. **Sentence sample of a referring lead-in (r+) and proclaiming a new and very important concept (p+)**

The computer program shows that the rising tone indicating the lecturer's dominant position referring to the already known or an old information isalso widely present, and it is seen on thediagram :*"It is really about…"*.

Results and discussion

Table 1 shows the average number of students' correct answerswhile listening to the scientific lecture before and after training. There is a tendency of improving the listening comprehension results after training.

Table 2 shows the average successful accomplishment in the percentage during the movie content comprehension. The reference values are given in the first column in brackets. The research results show some progress in listening after training, although the results still remain moderate.

The results which the students obtained after training to comprehend the speakers' prosody and intonation markers have not demonstrated a significant improvement of their skills, though the

tendency of listening comprehension progress is evident. The students showed the progress in dividing the text into paragraphs, marking out the key words, and the indicators of content reproduction grew either. However, the results in determining the direction of the intonation have received a poor increase. At the same time, the progress in specific tasks led to better results of the text content reproduction in general.

Table 1

Scientific lecture listening results

Questions complexity level	Without training, %	After training, %
*	77	87.5
**	67	79.0
***	34	44.5

Table 2

Popular scientific movie content comprehension results

Type of exercise	Without training	After training
marking out the keywords (23 words)	11	17
content reproduction (text restoration based on keywords) (100%)	37 %	43 %
intonation direction(9 items)	2	4
text division into paragraphs (8 paragraphs)	3	7
questions check (9)	4-5	5

Any evaluation of listening comprehension training results cannot be performed without certain constraints. It is not always clear whether the difficulties in performing the tasks lie in the students' poor comprehension of the passage, or the students do not know the language well enough to explain their thoughts [13]. The mechanism of perception can have an individual character depending on the experience of the listener. The listener can predetermine his listening strategy beforehand as the result of his background knowledge or prediction of the future listening material[14].That is why it is sometimes difficult to judge whether the students use the listening strategy they are being taught. The experimental reproducibility is difficult, because it is impossible to offer the students the same listening text two times: before and after training. In this case we are not sure about their progress. It may be the result of better comprehension of the text heard for the second time. It is doubtful if we can present the students with the listening material of the same complexity. There always will be certain differences concerning the speaker's voice, the manner of presentation, the choice of words etc. The research should be performed with different groups of students, considering that their knowledge of the language is approximately equal.

The research of the intonation role in conveying discourse relationships in oral sentences comprehension showed that the intonation may be the most recognizable means for indicating the distinction in English. The intonation used for marking the sentence structure accelerates the comprehension time of the sentence significantly.The position of the "given" information, which has the tendency to be placed at the beginning of the sentence and the "new" information, occurring at the end of the sentence produces less effect on the sentence comprehension than their marking out with the help of the intonation [15]. If the intonation is becoming one of the primary indicators of an information unit, the conditions of its perception should be studied with respect to oral scientific discourse comprehension.

Recommendations

Authors recommend the following.

1. To develop listening comprehension during the engineering student education;
2. To include training of prosody and intonation as the additional indicators of meaning into the programs dealing with listening skills;

3. To involve special computer software into the process of education;
4. To use the relevant on-line lecture content for the delivery of specific discipline courses taught in English;
5. To provide the students with tools for visualizing of prosody and intonation markers.

Conclusions

The experiment organized to find out the level of engineering students' oral scientific discourse comprehension demonstrated quite unsatisfactory results. At the same time, the training focused on developing the students' skills of oral discourse markers recognition demonstrated a certain improvement of the students' abilities to distinguish the prosody and intonation markers in recognizing the meaning. The authors are convinced that the students should be taught the functions of intonation and prosody as supplementary aids of understanding the meaning of the oral scientific discourse. These functions, when studied and paid attention to, are able to provide the students with an additional tool to realize the lecturer's intentions of communicating new and important information, or continuing with an already known subject.

Listening is not an easy skill to acquire. Listening for special purposes is especially complicated, because it is connected with understanding new ideas, concepts, information delivered in a foreign language. The whole idea of English for specific purposes lies in the importance of meeting the students' needs. Students' training organized in the walls of a higher educational establishment is able to stimulate their motivation aimed at listening comprehension self-education using modern on-line tools and educational materials.

References

1. Зиндер Л.Р. Общая фонетика и избранные статьи (General Phonetics and Selected Articles) Textbook for students of philological faculties of higher educational establishments. 2ed. M.: Publishing Center "Academy", 2007, 576 pp. (In Russian).
2. Бурая Е.А., Галочкина И.А. Фонетика современного английского языка (Phonetics of Modern English) Theoretical course. Textbook. M.: "Academy", 2006, 272 p. (In Russian).
3. Шевченко Т.И. Фонетика и фонология английского языка (Phonetics and Phonology of English). Textbook for Bachelors.Dubna: Phoenix, 2011, 256 p. (In Russian).
4. Brazil D., Coulthard M. Discourse Intonation and Language Teaching. London: Longman Group Limited, 1980, 205 p.
5. Gussenhoven C. On the Grammar and Semantics of Sentence Accents. Dordrecht: Foris Publications, 1983, 357 p.
6. Kingdon R. The Groundwork of English Intonation. Longmans, 1958, 272 p.
7. Gimson A.C. An Introduction to Pronunciation of English. London: Edward Arnold, 1964, 294 p.
8. O'Connor J.D., Arnold G.F. Intonation of Colloquial English. A Practical Handbook. Longman, 1978, 290 p.
9. Vassilyev V.A. English Phonetics. A Theoretical Course. M.: Higher school publishing house, 1970, 324 p.
10. The Great Ideas of Computer Science [online] [01.02.2016]. Available at: https://www.youtube.com/watch?v=3DaliESzEyk
11. The Agatha Christie Code (the movie, 2005) [online] [01.02.2016]. Available at: https://yandex.ru/yandsearch?&clid=2186617&text= 9
12. Praat: Doing Phonetics by Computer [online] [01.02.2016]. Available at http://savethevowels.org/praat/
13. Wilson J. How to teach listening. Pearson Education Limited. 2008, 192 p.
14. Леонтьев А.А. Основы психолингвистики (Fundamentals of Psycholinguistics). M.: Smysl, 1997, 287 p. (In Russian).
15. Bock J.K., Mazella J.R. Intonation Marking of Given and New Information: Some Consequences for Comprehension. Memory & Cognition, vol. 11(1), 1983, pp. 64-76.