

Universal and Linguistic Features of Expressing Emotional Information: Differentiation in the Perception Level

Inga Ibrakhim

Department of Japanese Linguistics
Osaka University, Japan
inga@mb1.kisweb.ne.jp

Abstract

The emotion in speech is expressed both by universal and specifically linguistic means. Cases of miscommunication between native and nonnative speakers in terms of expressing and interpretation this emotional information occurs mostly due these cultural and linguistic peculiarities. In addition to lexical means, the role of intonation in such cases is enormous. The present paper describes an experiment to discriminate the universal and linguistic features of expressing the emotional information in Japanese spontaneous speech by native and nonnative (Russians not speaking Japanese) informants in the perception level. A multi-dimensional model of emotion is used for marking the perceived emotional information. The results demonstrate considerable differences in defining the emotional information for native and nonnative informants, especially for such parameters as the basic atmosphere of an utterance and the attitude in interrogative utterances. This experiment also proved to be a good method for eliciting utterances where the linguistic features for expressing the emotion dominate which is particularly useful for studying the intonation in a given language.

1. Introduction

There are a specific action patterns which change with language culture in the same situation (for example, universal states, such as a greeting, celebration, gratitude, and sympathy). Such action patterns belong to language culture, and not only appear in specific expressions, but also differ in the level of language. However, the same action pattern may have different sometimes completely opposite meanings in different language cultures, resulting in miscommunication between the representatives of these cultures, and causing different response from what was intended (Стернин, 1989).

The same thing is true of emotion. The mechanism of emotion's arousal and realization is considered to be universal. On the other hand, the stimuli to produce an emotion and its expression vary depending on culture and language. (Wallbot, 1991). The result is a difference in the perception of emotional information between native and nonnative speakers.

The author's previous research on perception and interpretation of emotional information in speech has shown differences even for dialect speakers. These results were obtained not only in terms of intonation, but also in text and facial expression level.

To exclude the influence of lexics I decided to make a similar experiment using nonnative informants. This experiment might also serve as a method for extracting and further phonetic analyses of the utterances in which intonation is influenced by linguistic factors.

2. Methodology

2.1. The database creation method

Toda (1992) mentions the difficulties of laboratory-research of emotion resulting from the lack of appropriate database required for this kind of research. It is very hard to collect the emotional data of adequate quality for the analysis of intonation.

Existing spontaneous speech corpuses consist partly of monologues and lectures, partly of dialogs, but recorded in a formal or laboratory situation, which certainly is not good material for research on different types of emotion. Although there are valuable voice data in radio or a television stations such as plane crash recordings, such data is not readily available. Thus, in this experiment I used my own material collected within last 2 years in the Osaka region. The following conditions were maintained in creating a database:

- Control of speaker's background (place of birth, education, dialect, etc.)
- Long-term data collection (to trace different emotions and attitude for one speaker, also to get speakers used to such recording sessions and feel relaxed)
- Sound quality

The speech of three women was recorded over 2 years.

Due the long-term cooperation I obtained the confidence of speakers, so they could express their emotions freely, not being conscious of the microphone. Therefore, through these recording sessions I collected a database rich in variety of different emotions.

Initially, the speaker attached the microphone personally according to the author's instruction, recorded the conversation over a cellular phone. Later the cellular phone was substituted for a fixed-line telephone, to improve the recorded sound quality. Twenty to 30 minutes long phone conversations were collected twice a week. The reason for deciding on the prolonged conversation time is that as time passes one stops being conscious about the microphone and hence more natural emotions could be recorded. Finally, in order to use this data for research or publishing, the written speakers' consent was obtained for using the voice data.

The dialect sound was chosen for the database on purpose. It makes it possible to conduct comparative research on variation in expressing emotion with other languages as well as with other dialects of Japanese. Besides, emotion expressed in standard Japanese can be perceived by any dialect speaker due to the influence of mass media and hence standardization of the language does not allow us the opportunity to compare

expression of emotions in different dialects. Whereas, the dialect speech database is an excellent material for further studies of this phenomenon.

2.2. The procedure and method of experiment

2.2.1. Sound data

Of the three informants the data of just one person were chosen for this experiment. The informant's profile is in Table 1. Since I have chosen conversations with the same person we can observe how the same contents are generated in different moods.

The telephone dialogue voice data of the Osaka dialect speaker, a 19-year-old woman were used for the experiment. The conversations include very personal contents with a boyfriend. Conversations (four 90 minute DAT tapes) were recorded over a total of three months for 6 hours. Each conversation average self-sustaining time is 25 minutes (the time of a pause or a partner's speech are included). Three short utterances, which apply to the definition of the intonation phrase, were chosen from each of 10 conversations, cut out by Cool Edit 2000 and inputted into the computer from the DAT tape recorder. One utterance was copied at random 3 times to the DAT tape, and the edited utterance was played to the informants for estimating emotional information conveyed in it.

Table 1

Informant	F1
Age	19
Occupation	Student
High School	Nara-city
Mother background	Pref. Osaka, Ikeda-city
Father's background	Osaka-city

2.2.2. Respondents

Since for this experiment I used a database of Kansai dialect speech, for an appropriate interpretation of emotions expressed most of the respondents selected were also Kansai dialect speakers. Two persons' grew up elsewhere, Yokohama-shi, and Nagoya-shi, but have been lived in Takarazuka-shi, Hyogo (Kansai area) for last 20 years. All the non-native speakers selected were Russian speakers who did not speak and understand Japanese.

2.2.3. Method of evaluation the emotional information

The entry method of a reply paper was explained before the experiment, and it was practiced by using dummy. During practice, the example of judgment was given and the author answered respondents' questions. The main experiment was begun after checking that all the members had understood the reply method. In order to judge and describe the emotional

information in utterance, I used a multi-dimensional model of emotion consisting of the following seven standards:

1. Basic atmosphere of utterance bright/dark;
2. State of atmosphere: stable / instable;
3. Attitude in utterance: plus (positive) / or minus (negative);
4. Expressing the emotion: expressed / not expressed;
5. Intention of expressing an emotion: intended/not intended
6. Degree of expression
7. Degree of emotion

The degree of each parameter was estimated on 5-level scale: 1- very strong, 2-strong, 3-ordinary, 4-weak and 5-none. Here the existence of expression of emotion is linked to the parameter of the intention of expression, and therefore is a double check of the understanding of a respondent. Thus, if there is no expression of emotion, there must also be no intention of expression. Furthermore, estimation of the atmosphere of utterance is connected with the attitude in an utterance. If the answer is "bright", in most cases the plus evaluation is essential. On contrary, answer "dark" would be associated with a negative attitude. The above emotion evaluating system combines the features of the model of emotion from Feeltrace and of Plutchik. A pilot survey showed such a system reduced the variability of the opinion of respondents, which is often a problem with lexical markers of emotion, and was easy to use.

The two dimensions of emotion which were employed in Feeltrace's model, evaluation and activation, were interpreted here in more detail such as the fundamental atmosphere of utterance, its attitude, the degree of emotion, degree of expressing the emotion. Furthermore, since intention of expressing the emotion is important information for the interpretation of emotion in the process of communication, this parameter was also added. The durability of a mood and the transient nature of emotion are mentioned in literature, hence to trace a difference between a mood and emotion perception, I set up the parameter of stability/instability of fundamental atmosphere of an utterance. However, when the answers on this parameter were analyzed variation was large, so I could not come to a conclusion as to whether the respondents had understood this parameter or not.

3. Results

As stated above, one utterance was copied and recorded at random 3 times, and then it was played to respondents. Two matching answers of three given were interpreted as a final answer. If for example in the evaluation of attitude in utterance, judgment of plus was in 4 answers, and of minus was in 6 answers, it was interpreted as the evaluation in this utterance being perceived as minus. If combinations were 5 to 5 these data were excluded, although the situation did not arise.

The interrogative sentence and the declarative sentence were divided into 2 groups as shown below (Table 2). The utterances for which the perception of native and nonnative respondents differ are shown in gray, and the rate of difference is given at the bottom of a table.

Table 2 The evaluation of basic atmosphere of utterances
(units: pers.)
for interrogative utterances for declarative utterances

	Japanese		Russians			Japanese		Russians	
	"Dark"	"Bright"	"Dark"	"Bright"		"Bright"	"Dark"	"Bright"	"Dark"
F4	9	1	5	3	F11	9	1	5	3
F19	9	1	2	6	F28	9	1	7	1
F2	8	2	0	8	F29	8	2	6	2
F10	8	2	0	8	F16	8	2	6	2
F24	8	2	1	7	F17	7	3	6	2
F27	8	2	6	2	F12	7	3	2	6
F1	7	3	1	7	F23	7	3	2	6
F7	7	3	3	5	F26	7	3	5	3
F9	7	3	6	2	F18	3	7	5	3
F21	7	3	2	6	F6	2	8	1	7
F20	2	8	5	3	F3	1	9	2	6
F22	2	8	8	0	F8	1	9	1	7
F13	1	9	0	8	F14	1	9	0	8
F5	0	10	1	7	F15	1	9	0	8
Diff. rate	64.3% (9/14 ut.)				F30	1	9	1	7
					F25	0	10	0	8
					Diff. rate	18.8% (3/16 ut.)			

As can be seen, a difference between a native speaker and a non-native speaker appears in the evaluation of an interrogative sentence in many cases. On the other hand, the results, related with the atmosphere of utterance of a declarative sentence and expression of emotion, are very similar for Japanese native speakers and a non-native respondents. This result is the same for the perceiving of the emotional information in French by the French speakers and the Russian native speakers (Юпова, 1997). Moreover, the results show that a mood and an attitude are closely connected and their combination is perceived as the emotional information of the utterance. That is, judgment of the evaluation of fundamental atmosphere and attitude of utterance are correlated like "bright = plus evaluation" and "dark = minus evaluation". As we can see from Table 2 for both native and nonnative respondents there is a tendency to estimate most of declarative sentences as "bright" and positive. On the other hand, interrogative utterances in most cases are estimated as "dark" and negative. The utterances whose evaluation corresponded to 100% of answers are also unexpectedly often seen in judgments of non-native respondents. This could be explained by the fact that native speakers consider both segmental (lexical) information and suprasegmental (intonational) information, while nonnative respondents rely only on the intonation of the utterance in interpreting its emotional information. For instance, for utterances F11, F12, and F26, where segmental information had a strong negative meaning, work of intonational information is considered to be less (that is its influence on interpreting the utterance is less) than for the cases where segmental information is neutral. In contrast, judgment of emotional information differs in spite of the same segmental information in utterances F7 and F13, evidently due to a contribution of intonation. Judgments of the native speakers

and nonnative respondents about these two utterances differ. This phenomenon requires further examining in later study.

Furthermore, the results showed a close relation between intention in expressing the emotion and its degree. As in the case of basic atmosphere and attitude, the difference in judgments of native and nonnative speakers appeared in interrogative utterances. This suggests that the expression of emotion in interrogative utterances results from specific linguistic means, while in declarative sentences it is more nearly universal.

In interrogative utterances native speakers define most of the expression of emotion as intentional while there is no such inclination in the answers of nonnative respondents (see Table 3). On the other hand, in the case of a declarative sentence, most of nonnative respondents answered that there was no expression of emotion, and no intention to express it. In contrast, in native speakers the tendency is not clear. These results might be interpreted as that regardless of language interrogative utterances are perceived as more emotional than declarative, and may be explained with peculiarities of their intonational pattern.

The parameters concerning degree proved to be too abstract and subjective evaluation by non-specialist respondents, and since there was much variation in results, they are not examined here. However, it was observed as a preliminary result that the difference between men and women in evaluation of the degree parameter is observed.

The level of evaluation of a degree of the female respondents was higher than the male respondents. Perhaps, this result should be interpreted considering that data from a women-informant were used in this experiment.

Table 3 The evaluation of intention of expressing emotions (units: pers.) a. for interrogative utterances

	Japanese		Russian	
	Intentionally Expressed	Not expressed	Intentionally expressed	Not expressed
F1	10	0	2	6
F24	9	1	7	1
F10	8	2	5	3
F13	8	2	3	5
F20	8	2	3	5
F9	7	3	6	2
F19	7	3	1	7
F22	7	3	5	3
F2	6	4	2	6
F4	6	4	2	6
F21	6	4	7	1
F27	6	4	2	6
F5	4	6	1	7
F7	2	8	2	6
Diff. rate	57.1% (8/14 ut.)			

b. For declarative utterances.

	Japanese		Russian	
	Intentionally expressed	Not expressed	Intentionally expressed	Not expressed
F25	9	1	7	1
F8	8	2	6	2
F12	8	2	7	1
F18	8	2	3	5
F30	8	2	6	2
F11	7	3	7	1
F17	7	3	2	6
F23	7	3	6	2
F28	7	3	6	2
F29	6	4	5	3
F3	3	7	5	3
F6	3	7	6	2
F16	3	7	2	6
F15	2	8	5	3
F26	2	8	1	7
F14	1	9	6	2
Diff. rate	37.5% (6/16 ut.)			

4. Discussion

The experiment showed the validity of using the 7-D (7 dimension) model in perception and evaluation of emotion, except in the parameters of degree. Moreover, such a method might be used as a filter for differentiation of universal and specifically linguistic peculiarities of expressing the emotion by means of intonation.

It turns out that the difference between a native speaker and a non-native speaker appears more notably as the difference in the evaluation of the intonation pattern of an interrogative sentence. It is especially notable for the evaluation of the atmosphere of utterance, and its attitude. A following interpretation of this fact is suggested. The feature of the emotional content in an interrogative sentence belongs to language culture, and that of a declarative sentence is more nearly universal.

The pattern of the intonation of an interrogative sentence is perceived with an emotional bias different from that of a declarative sentence, and it is thought that the interpretation of biases will change depending on language. In order to investigate which of the above hypotheses is more effective, the prosodic features of the voice data used for experiment needs to be analyzed.

It was admitted that a mood and an attitude were perceived as the same emotional information. Hence, validity of using the term "emotional information" which grasps these two phenomena on the utterance level is accepted.

The evaluation of degree proved to be abstract and subjective regardless of native language. Therefore, it was decided not to use these details for evaluation the emotion. However, the point that a man-and-woman difference in evaluation of a degree is seen is interesting and might be a subject for further research.

In the process of investigation, coincidence of evaluation of utterance is also unexpectedly often obtained in the judgments of non-native respondents. This is considered to be because of the strong influence of intonational information and segmental information on judgments of native speakers, while non-native respondent depending only on voice information. Especially when segmental information has a strong negative meaning, it is leaves comparatively little work for prosodic information. In contrast, judgment of feeling information differs in spite of the same segmental information. In these cases, judgments of the native and non-native respondents about an utterance differ. It decided to examine this thing in detail at future.

5. References

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