The Effect of Filled Pauses in a Lecture Speech on Impressive Evaluation of Listeners

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Abstract

This paper examines and reports on how “filled pauses” included when delivering speeches influence the understanding, and change the impression, of the speech as shown through the research and experiments conducted on trial subjects. We conducted research about speeches and lectures given at classes at our university, and at academic meetings. A questionnaire related to filled pauses was given to audiences in university classrooms, and the speeches given where recorded. Then, we prepared a number of speeches that were manually altered to put emphasis on the frequency, position, and duration of filled pauses in the speeches. Comparing those speeches with the original speeches which were not processed in our listening experiments, we were able to estimate the effect of filled pauses in a lecture speech and how effective these were in altering the impressions of the audiences. We were able to find the best conditions related to the frequency, position, and duration of filled pauses, and how these conditions clearly changed a lecture or speech into a better one which is easy to understanding and listen to for the audience.

Index Terms: Spoken language, Lecture speech, Evaluation of lectures, Filled pause

1. Introduction

All of the national universities in Japan have been restructured to independent administrative corporations. In addition, the number of students taking a national university entrance exam is decreasing because of the declining birthrate. In those social backgrounds, the national universities are focusing on the quality of education to survive in our intensely competitive society. Most of them hold a lecture prepared by faculty development for university teachers to improve the quality of academic lectures.

There are various factors affecting the quality of lectures, such as content, the way to talking, speaking skills and the presentation form of lectures. It is very important for us to pay attention to how we speak in order to effectively convey the meaning of what we are trying to say to someone. The way of speaking affects such things as how well people understand our speech, as well as influencing our listeners overall impression of the speech. In university and academic meeting lectures, not only the techniques of presentation but also the way of speaking is very important.

Our final goal is to develop a training system of speech which can feedback appropriate advice about weak points on speech to a speaker by automatically evaluating the way of talking by the speaker. To do that, it is necessary to capture the characteristics of speeches. We have already analyzed lecture-style speech and reported the result of investigation of analyzing only acoustic features in lecture speeches. We especially focused on filled pauses in spontaneous speeches in this paper. Although there are the previous studies related to analyzing filled pauses\cite{1}\cite{2}\cite{3}, this paper investigated how filled pauses included in a spontaneous speech influence understandings and listening ability of audiences.

Figure 1 shows the outline of our research. We used lecture speeches of a university and academic meetings. First of all, attending students answered a questionnaire about whether the frequency of filled pauses in a university lecture speech by a teacher is appropriate or not. Based on the result of the questionnaires, appropriate rate of filled pauses included in the lecture speech are extracted (shown in Fig.1 (a)). Next, we investigated about the duration and position of filled pauses by using an academic lecture speech in which the rate of filled pauses was altered to be the most suitable as shown by the questionnaire. As shown in Fig.1(b), we prepared a few kind of speeches by processing the lecture speech relative to the duration and position of filled pauses, and subjects compared and ranked each speech. Finally, a lecture speech, which was manually generated based on previous listening experiments and the most relevant parameters on the rate, duration and position of the filled pauses, was used for making sure if our parameters of filled pauses were suitable. This was done by listening experiments. The experimental result showed that a lot of the test subjects selected the speech that including our delivered parameters relevant to filled pauses as opposed to the original speech.

2. Recording Lectures

2.1. Lecture Speeches

Lecture speeches of a university and academic meetings are targeted in this research. We used the CSJ (Corpus of Spontaneous Japanese)\cite{4} as the lecture speeches at the academic meetings.

On the other hand, we have been recording university lecture speeches related to mathematics, physics and computer science at the department of Computer Science and Media Engineering, University of Yamanashi for over two years. The data of the lecture speeches of the university includes 40 lectures. The number of subjects and teachers was 28 and 11, respec-
the experiment about the frequency of filled pauses

The lecture speeches were recorded to a DAT or an IC recorder by using a wired lapel microphone not to disturb the classes. The classrooms used for the recordings are commonly used, however did not any audio equipment in particular.

2.2. Questionnaire

At the same time as recording the lecture speeches, attending students answered the questionnaire on the lecture speeches. The content of the questionnaire has 21 question related to acoustics and linguistics such as loudness, duration, intonation, voice clarity, short pauses and filled pauses. The question about filled pauses was used in this research, and the remaining questions was utilized in other research. Each question had a scaled answer that students used in evaluating the lectures. The number of auditing students was from 20 to 70, there were about 30 students in average in a class.

3. Analysis of Filled Pauses

Filled pauses are the kinds of interjections that speakers unintendedly utter or are sometimes used to maintain control of a speech while thinking of what to say next. And filled pauses do not add any new information to the speech words and do not have any meanings themselves[6]. For example: “Um I'd like to talk about uh binary tree.” In this sentence, “Um” and “uh” are filled pauses. In Japanese, “eeto”, “ah” and “mah” and so on are usually used as filled pause.

3.1. Outline of the Experiments

We focused on three characteristics of filled pauses as follows:

- rate (frequency) of filled pauses
- position of filled pause
- duration of filled pauses

The lecture speeches at the university and the academic lectures included in the CSJ are targeted in this paper. Subjects listened to the lectures that included various characteristics of filled pause such as rate, position etc. Then, they answer the questionnaire on understanding and listenability. Comparing the parameter of filled pauses with the result of the questionnaire, we analyzed how filled pauses included in the speeches influence understanding and listenability of speeches for the audiences.

3.2. Rate of filled pauses

This experiment makes clear how the frequency of filled pause (the rate of filled pauses in the lecture speeches to all words uttered) affects the audiences.

As shown Fig.1(a), first, subjects answered the questionnaire of 5 steps. The content of questionnaire is “How appropriate does the teacher use the filled pauses in the lecture?”. Evaluating in 5 steps.

- High performance is a result of higher than 3.5 points.

Based on the result, next, we investigated that whether the rate of about 6.5% is suitable or not by using the listening experiment. In the experiments, we prepare three kinds of speeches that are from a lecture included in CSJ. Duration of each lecture is about one minute. Each speech is only different is the rate of filled pauses as follows:

- the rate of filled pauses is about 12% (original speech),
3.3. Position of filled pauses

This experiment makes clear how the position of filled pauses (at the head and middle of lecture speeches) affects overall impact of the speeches for the audiences. We define the respective "positions" as follows:

- head: filled pauses located at the beginning of an utterance,
- middle: filled pauses located in the middle part of an utterance.

First, we performed a preliminary listening experiment by using two kinds of speeches. One of the speeches had utterances in which the majority of filled pauses were located in the "head" part. The ratio between "head" and "middle" is 10:1. On the other hand, the other speeches were composed of utterances in which most of filled pauses were in the middle part of the utterances. The ratio between "head" and "middle" is 2:9. Those speeches are the same as the speeches used in the experiment in section 3.2. In addition, the speeches are manually created and includes the filled pauses at a rate of 6.5%. Five of the subjects selected which was the best speech on the point of view of "understanding" and "listenability". In the experimental result, the speech of "10:1" were better than the speech of "2:7" regarding listenability and understanding. However, there are no significant differences between the speeches.

Next, we prepared the new speech in which the ratio between "head" and "middle" is 7:4. The 45 subjects (university students) joined the listening experiment where three kinds of speeches, (that is "10:1", "7:4" and "2:9"), were used. The experimental results are shown in Table 2. The reading of Table 2 is the same as Table 1, the rankings are then converted into the score.

As shown in Table 2, the speech, where the ratio between "head" and "middle" is 7:4, is evidently the best performance as ranked by the subjects.

3.4. Duration of filled pauses

This experiment makes clear how the duration(length) of filled pauses (long and short filled pause in the speech) affects the overall impact of the speeches for the audiences. We categorized filled pauses according to their duration as follows:

- long: filled pauses including more than 2 syllables, such as "eetto",
- short: filled pauses include only 1 or 2 syllables, such as "e" and "ah".

We prepared two kinds of speeches, and performed the preliminary experiment as well as the experiment detailed previously by using the filled pauses. The original lecture speech is the same as section 3.2, 3.3. Ones in which all filled pauses are "long" and the other in which all filled pauses are "short" were used in the preliminary listening experiment. The original speech was evaluated by the subjects in addition to the above two speeches.

The five subjects spontaneously made a choice among those three speeches on the point of view of "understanding" and "listenability" in the experiment.

In the result, the original speech was selected as the best speech in regards to both understanding and listenability. There was no significant difference in the evaluations between the two speeches, and the duration of filled pauses in the original speech were distributed uniformly.

Next, we created two new kinds of speeches as follows:

- (long, short): duration of filled pauses located at the beginning of the utterances is long, while duration of filled pauses located in the middle part of the utterance is short,
The condition of filled pauses in a spontaneous speech affects changes it to a better one that is easy to understand and listen to.

The appropriate usage of filled pauses in a spontaneous speech was obviously in the majority compared to the subjects who selected the original speech. This shows that the final inspection of the suitable conditions of filled pauses showed that these clearly changed the lecture speech into better ones which were easy to understanding and listenability. Furthermore, in the final inspection of the experiment of the suitable conditions of filled pauses showed that these clearly changed the lecture speeches into better ones which were easy to understanding and listen to for the audience. By using filled pauses well, a person’s speaking skill considerably improved.

In future work, we will work on developing a training system of speech by using the result of these experiments.

### Table 3: Duration of filled pauses

<table>
<thead>
<tr>
<th>rank</th>
<th>original</th>
<th>processed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>13 [14]</td>
<td>11 [8]</td>
</tr>
<tr>
<td>3</td>
<td>10 [12]</td>
<td>16 [17]</td>
</tr>
</tbody>
</table>

* listenability [understanding]

### Table 4: The suitable condition of filled pauses

<table>
<thead>
<tr>
<th>factors</th>
<th>condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>rate</td>
<td>about 6.5%</td>
</tr>
<tr>
<td>position</td>
<td>(head:middle) = (7:4)</td>
</tr>
<tr>
<td>duration</td>
<td>distributing fairly long Filled Pauses and short Filled Pauses, except (head,middle)=(short,long)</td>
</tr>
</tbody>
</table>

- (short, long): the reverse of the above conditions, i.e. (long, short)

Those two speeches and the original speech were evaluated by 39 subjects. Table 3 indicates the result of this experiment. Once again, the original speech is the best in regards to both understanding and listenability.

In no significant way was the speech of 

| (long, short) | worse as compared with the original speech because the score is positive and there is no significant difference between the 
| (long, short) | version and original. The result claims that it is hard for audiences to understand what the speech-giver is trying to say when the duration of filled pauses located in the middle of an utterance is long as compared with the shorter filled pauses.

### Table 5: The result of inspection (number of persons).

<table>
<thead>
<tr>
<th>better speech</th>
<th>Lecture A</th>
<th>Lecture B</th>
<th>Lecture C</th>
</tr>
</thead>
</table>

* listenability [understanding]

meeting etc., you should pay attention to filled pauses, as it will help you to be a better speaker.

### 4. Conclusions

This paper examined and reported on how filled pauses included when delivering speeches influence the understanding, and change the impression, of the speech as shown through the research and experiments we conducted on trial subjects.

A questionnaire related to filled pauses was given to audiences in university classrooms, and the speeches given where recorded. Then, we prepared a number of speeches that were manually altered to put emphasis on the frequency, position, and duration of filled pauses in the speeches. Comparing those speeches with the original speeches which were not processed in the listening experiments, we were able to estimate the effect of filled pauses in a lecture speech and how effective these were in altering the impressions of the audiences. Furthermore, in the final inspection of the experiment of the suitable conditions of filled pauses showed that these clearedly changed the lecture speeches into better ones which were easy to understanding and listen to for the audience. By using filled pauses well, a person’s speaking skill considerably improved.

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### 5. References


