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Effects of Speech Rate and Background Noise on EFL Learners' Listening Comprehension of Different Types of Materials

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The present study examined the effects of speech rate and background noise on EFL learners' listening comprehension of film and textbook materials. The participants listened to eight different types of dialogues with different conditions in the speech rate, the background noise, and the types of learning materials, and their listening comprehensibility was measured. For the speech rate factor, either a fast or a slow speech rate was used. The background noise effect was executed by adding crowd talking noise to the dialogue. The script was adapted from either textbook materials or film materials. The results showed that each factor had an influence on learners' listening comprehension. Though the readability, word levels, and the number of words were at the same level, the scores when textbook materials were used were significantly higher than that of the film materials. Regarding the textbook materials, they had higher scores with the slow speech than the fast speech, and also the scores in the silent condition were higher than that of the noise condition. The students' listening comprehension score was the lowest where there was background noise and a fast speech rate.

Keywords: listening, authenticity, speech rate, background noise, material type

Introduction

In the language education field, various types of materials have been used for listening instruction. Among others, films have been used for a variety of purposes, such as motivational improvement, intercultural communication, and grammar instruction (Akimoto & Hamada, 2007; Hammer & Swaffar, 2012; Johnson, 2008).

Although both learners and instructors recognize the advantages of films as teaching materials, studies related to the use of cinematic materials in language teaching are scarce. Most studies on the use of films are concerned exclusively with student motivation or merely report how films have been used in lessons (Hirano & Matsumoto, 2011; Johnson, 2008; Shea, 1995). Consequently, little is known about the effects of films on learners' listening comprehension abilities. Some studies have examined speech rates and the use of collocations in films (Furuchi, 2011; Nitta, Okazaki, & Klinger, 2010a). In addition, a few studies have been conducted on the linguistic characteristics of film materials. Nevertheless, there is much work to be done in this area, including the need to examine the most challenging factors for learners in regard to the comprehension of films.

Fast speech rate and presence of background noise are distinctive linguistic features that make comprehension of films difficult for English language learners. Fujita (2014) conducted a longitudinal study examining the effects of using films as teaching materials on learners' listening comprehension. Fujita's study found that fast speech rate and presence of background noise prevent learners from optimal

comprehension. Porter and Roberts (1981) also point out that fast speech rate and background noise are factors that distinguish authentic spoken language from textbook materials. Regarding pace, listening activities in textbooks are usually spoken more slowly, causing learners to be less familiar with the relatively rapid pace of speech in authentic discourse. The absence of background noise is also mentioned as one of the characteristics distinct in textbook materials. In the case of textbook materials, disturbing extraneous noise, such as passing cars and other people talking, is eliminated (Porter & Roberts, 1981). However, fast speech rate and noise are natural and integral parts of the authentic listening experience, including in viewing films.

Speech rate and background noise are characteristics that distinguish films from textbook materials. Therefore, the present study is conducted to investigate the effects of speech rate and background noise on listening comprehension of film materials.

Literature Review

Speech Rate

There have been many studies conducted regarding the effect of speech rate on listening comprehension. Most of the studies related to listening comprehension reported that non-native speakers benefit from a slow speech rate. In the studies conducted by Griffiths (1990, 1992), he compared the listening comprehension of three speech rates, ranging from fast (200 words per minute, wpm, average 150 wpm), to slow (100 wpm). The results suggested that the learners' listening comprehension of the fast speech rate was significantly worse than that of the average and slow speech rate. However, no significant difference was observed in comprehension between the average and slow speech rates. The finding of Griffiths suggested that although learners benefit from a slower speech rate, slowing the speech rate might not be effective at certain levels. He also mentioned that there were individual differences in the perception of the speech rate.

Zhao (1997) also claimed that there were individual differences in the perception of speech rate. In his study, he examined whether giving control of speech rate would help learners comprehend more than repeating a passage spoken at a fast speech rate (185 wpm). It was found that even if they were allowed to repeat the passage at a fast speech rate, their comprehension was not as high as those who were able to control the speech rate. Derwing and Munro (2001) conducted a study focusing on Chinese ESL students, and they concluded that learners were comfortable with the speech rate which is similar to their native language.

In a longitudinal study, McBride (2011) examined the effects of speech rate on learners' listening improvement. She compared four groups. In Group 1, they listened to fast speech (180 wpm); in Group 2, they listened to slow speech (135 wpm); in Group 3, they were allowed to choose the speed; and in Group 4, they were allowed to pause the materials. The results suggested that listening to the slow-paced speech helped them improve their listening abilities the most because they improved the bottom-up processing. The previous studies mentioned above show that a slow speech rate is beneficial to learners' listening comprehension, although the perception of slow speech rate depends on individual preferences.

Background Noise

Noise or background noise is another factor that affects EFL learners' listening comprehension. Field (2008) notes that noise in the second language (L2) context is different from that of the first language (L1). In an L1 situation, when no noise can be heard, listeners feel a high level of confidence in listening comprehension. However, in the situation with background noise, they need to draw much more heavily upon context and co-text, as listeners cannot trust the input so completely. L2 listeners, on the other hand, cannot decode as well because of problems of recognition or lack of linguistic knowledge (Field, 2008).

Most of the past studies related to noise have focused on the comparison between native and non-native listeners and studies focusing on L2 learners are scarce. Rogers, Dalby, and Nishi (2004) focused on the effects of noise on the presence of speakers' foreign accents. They compared the intelligibility of native and Chinese- accented English speech in a quiet situation and mixed with three different levels of background noise. The results suggested that adding noise to the highly proficient Chinese-accented English speech reduced the intelligibility significantly more than that of native speech, indicating that in the condition where noise is heard as background noise, the listeners might have some trouble understanding what non-native speakers say.

In another study, Rogers, Lister, Febo, Besing, and Abrams (2006) focused on the listening comprehension of native and bilingual speakers. They compared the word recognition of native speakers and Spanish-English bilinguals in quiet and noisy situations, and in noisy situations with reverberation conditions. The results showed that the bilinguals' word recognition was significantly poorer than that of the native speakers under the noisy condition. The authors indicate that even the bilinguals who started to learn English at an earlier age had difficulty in listening comprehension in the noisy situation compared with native speakers' comprehensibility.

Shi (2010) focused on bilingual listeners' age of acquisition and their use of contextual information. He examined whether the English acquisition age affects listening comprehensibility in noisy conditions. The results suggested that listeners' age of acquisition affects the use of context in noise and reverberation conditions. It was also indicated that native and early bilingual listeners' use of context was as effective as that of monolingual listeners, but they were not able to use context as effectively as monolinguals in the degraded conditions.

Among the few studies related to noise and language learners, Hodoshima, Masuda, Yasu, and Arai (2009) focused on the effects of learners' proficiency levels on listening perception in noisy conditions. They had participants with different proficiency levels take word identification listening tests under quiet, noisy, or reverberant conditions. The results showed that all participants' listening comprehensibility deteriorated under the noisy and reverberant conditions. Moreover, the lower-level learners were negatively affected by the noise more than the upper- level learners. Powers et al. (2002) focused on the effects of noise on test takers and they examined how test takers were distracted by the noise made by other test takers taking different tests. They used three different standardized tests and the results showed that the distraction had a large impact on examinees' perceptions, but the impact was slight or negligible in their test scores.

There have been other studies that focused on the effects of noise combined with the effect of the speech rate. Shi and Farooq (2012) examined the effects of noise and speech rate on bilingual listeners' comprehension. They had bilingual listeners listen to passages spoken at five different speech rates, and for each speech rate, quiet and noisy versions were implemented. The bilingual listeners' comprehension was compared with that of native monolingual listeners. The results showed that the combination of speech rate and noise negatively affected their listening comprehension the most. Also, the degree that the noise affected their listening comprehension changed in accordance with the speech rate.

As described above, the effects of speech rate and background noise to listening comprehension have been studied by some researchers. However, no studies to date have focused on whether the effects of the speech rate and the background noise differ depending on different material types. Moreover, it is not clear which factor, speech rate or background noise, affects listening comprehension more. Therefore, the current study aims to determine the effects of noise and speech rate on learners' listening comprehensibility of textbook and film material. These factors are analyzed with scripts taken from both film and textbook materials. The following research questions were addressed in the current study.

RQ 1: Do background noise and speech rate have an influence on learners' listening comprehensibility?
RQ 2: Are the effects of background noise and speech rate on learners' listening comprehensibility different depending on the material types?

Pilot Study

Overview of the Pilot Study

The aims of the pilot study were to determine the levels of listening tests that were at the participants' proficiency level and to decide the test format to assess their listening comprehensibility. Though the participants took a listening proficiency test before the experiment, it was necessary to determine the level of listening input that the participants were able to dictate to avoid the floor effect.

Twelve students were randomly selected from the participants, and they took the pilot study. The materials consisted of textbook materials and film materials. The textbook materials were adapted from the listening section of pre-second and third grade Standardized Test for English Proficiency (STEP) tests (Seibido Shuppan, 2012a. 2012b). The film materials were taken from a film script of *Night at the Museum* and the scripts were converted into synthetic speech using Globalvoice English ver. 2. The speech rate was set to be 140 wpm, which was the speech rate of pre-second and third grade STEP tests. Two test formats, partial dictation and whole dictation formats, were used. In the partial dictation, each dialogue had 20 blanks. The participants listened to each dialogue and the instructor paused after each blank to give them enough time to write down what they heard. For the dictation test, pauses were added after each sentence to give them the time to transcribe. The participants wrote their answers on the dictation sheet given by the instructor. In the pilot study, no background noise was added nor a fast speech rate used, because the aim of the pilot study was to determine the difficulty level of the material that the participants were able to transcribe (at a slow speech rate and without background noise). It was assumed that the effects of background noise and speech rate would not be measured if the participants were unable to transcribe the dialogue itself.

Results of the Pilot Study

The results of the pilot study are shown in Table 1, and they have some indications regarding the experiment. First, the speech rate that the participants were able to comprehend well was determined to be 140wpm. The mean dictation scores of the textbook materials were 78.0% in the full dictation test and 75.4% in the partial dictation test. On the other hand, in the film dictation test, the mean score of the full dictation test was 47.5%, while that of the partial dictation test was 57.5%. Therefore, the speech rate that the participants would be able to comprehend and that would be used in the experiment was determined to be 140 wpm.

Second, the test format applied in the experiment was the whole dictation test. In developing the partial dictation test, it was hard to decide which words should be left as blanks, because the blanks had a great effect on the accuracy of the comprehensibility measurement. The results of the pilot study showed that there was no big difference between the scores of the dictation test and that of the partial dictation test. However, it was concluded that the dictation test was better in accurately measuring the test takers' listening abilities.

Third, the speech type used for the film and textbook materials was the same. In the pilot study, synthetic speech was used only for the film test. Although a previous study showed that there were no differences in learners' listening comprehension between the sound of synthetic speech and that of the natural voice (Hirai & O'ki, 2011), some of the students' comments suggested that the synthetic speech test was more difficult for them. To avoid the influence of the speech type, whether synthetic speech or not, it was decided that synthetic speech would be used for both teaching and film materials.

Based on results of the pilot study described above, the following decisions were made to apply to the experimental study. The speech rate of the slow speech was determined to be 140wpm; the whole dictation test would be applied to the experimental study; and synthetic speech would be used for both material types.

TABLE 1
The Means for the Dictation Tests

	Dictation test		Partial Dictation test	
Material Type	*M*	Full score	*M*	Full score
Textbook	21.8(78%)	28	14.3 (75.4%)	19
Film	14.3 (47.5%)	30	11.5 (57.5%)	20

Note. The percentages of correct answers are in parentheses.

Method

Participants

A total of 108 undergraduate students at a private university in Japan took part in this study. All participants had normal hearing. The data of 18 students were excluded from the analyses as they were absent in one of the tests and they could not complete the task. Therefore, the data of the remaining 90 students was analyzed for this study.

Materials

Listening proficiency test

The proficiency test was adapted from a Test of English for International Communication (TOEIC) Bridge practice test (Takayama & Tozer, 2009). Because of the time constraint, 22 items from the listening section were used.

Listening tests

Scripts

Four dialogues were chosen from each of the textbooks and film materials (See Appendix A). It is argued that input type, whether it is monologue or dialogue, affects learner's listening comprehension (Papageorgiou, Stevens, & Goodwin, 2012). Therefore, the dialogic input was chosen for both materials. For the textbook material, items from the third grade STEP test (Seibido Shuppan, 2012b) were used. The third grade STEP test was chosen, as the pilot study suggested that the test was appropriate for the participants' proficiency levels. For the film material, scripts from films were used. Four films from various genres were selected as follows: *Night at the Museum* (comedy), *Roman Holiday* (classic), *You've Got Mail* (romantic comedy), *Bourne Identity* (action). In order to avoid the effects of the materials' difficulty levels on the students' listening comprehensibility, the number of words and the readability were maintained to be the same among the materials.

Table 2 shows the number of words and readability of each material. Because it was assumed that dictating long dialogues would make the participants tired in the last part of dictation, and the fatigue would affect their listening comprehension, short dialogues consisting of around 30 words were selected rather than long dialogues. The readability was measured using the scales of Flesch-Kincaid Grade Level (FKGL), Flesch Reading Ease (FRE), and The JACET List of 8,000 Basic Words (JACET 8000). In JACET 8000, the percentage of word levels in levels 1 to 3 were maintained to be the same.

TABLE 2
The Number of Words and Readability of the Materials

Material Type	Textbook				Film			
	No.1	No.2	No.3	No.4	Night at the Museum	Roman Holiday	You've Got Mail	Bourne Identity
Number of words	30	24	28	26	30	30	28	29
FRE	93.5	87.9	90.3	94.1	93.5	96.4	92.6	90
FKGL	1.6	2.4	1.8	1.4	1.6	1.3	1.8	2.1
JACET Level 1-3	87%	89%	92%	100%	83%	100%	89%	97%

Process of developing listening materials

Two types of speech rate were used in the current study. In the previous studies, various speech rates, ranging from 185 wpm to 200 wpm were used as fast speech rates (Griffiths, 1990, 1992; Zhao, 1997). In the present study, the mean of those speech rates, which is 190 wpm, was used as the fast speech rate. Therefore, the fast version was created with a speech rate of 190 wpm, and for the slow version, the speech rate of the dialogues in the third grade STEP test, which was 140 wpm, was adopted. The scripts were converted into synthetic speech using Globalvoice English ver. 2, a text-to-speech synthetic program.

Regarding the background noise, the noise of *crowd talking* (Sound Jay', 2014) was applied. The background noise was added at a signal to ratio (SNR) of +10db. In previous studies that examined the effects of noise on listening comprehension, the SNR varied depending on the listening proficiency. In the experiments in which the participants' proficiency levels were high, such as bilinguals, the sound file was mixed with noise at a SNR from -5dB to +10dB (Rogers, Lister, Febo, Besing, & Abrams, 2006; Shi, 2010). In the experiments in which participants' proficiency levels were low, noise at a SNR of +5dB to +15dB was adopted (Hodoshima, Masuda, Yasu, & Arai, 2009). As the participants' proficiency levels were low-intermediate, and not as high as bilinguals in the current study, the SNR of +10dB was applied.

Using Audacity, free software for recording and editing sounds, eight kinds of sound files were created. First, the sound files at the speech rate of 190 wpm and 140 wpm were developed using Globalvoice English ver. 2. Then, the sound files were further mixed with background sound, and the SNR was also adjusted using Audacity.

As Figure 1 shows, each material type has four different kinds of speech; slow speech with background noise (Slow and Noise), slow speech without background noise (Slow and Silent), fast speech with background noise (Fast and Noise), and fast speech without background noise (Fast and Silent). In total, sound files of eight different kinds of conditions created.

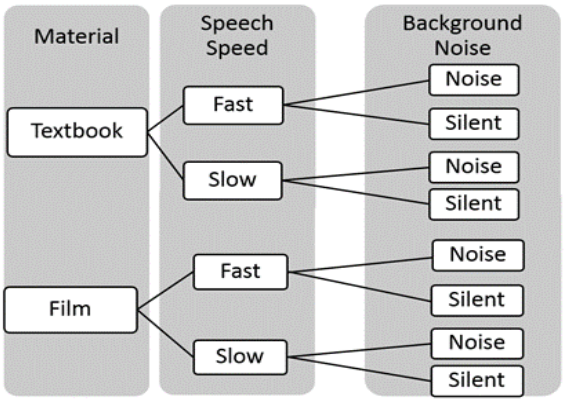

Figure 1. Sound files with eight conditions.

Questionnaire

After the students finished the dictation test, they answered a questionnaire regarding their listening comprehension of the dictation tests (See Appendix B). The questionnaire consists of five questions: two questions about film material (Part A), two questions about textbook material (Part B), and one question about the comparison of the two parts. As the students had not been told about the differences in the materials types, film material was termed as Part A, and textbook material was termed as Part B. It was a concern that telling them about the material types would affect their responses on the questionnaire. For each part, one question was about the dialogue that the students found the easiest to comprehend, and the other question was about the dialogue that was the most difficult for the students to comprehend. In the fifth question, the students were asked to choose one part that they felt was more difficult to comprehend. After each question, the students were asked to write the reasons why they felt that way.

Procedure

The experiment was conducted in a quiet classroom. The participants listened to the eight dialogues and recorded what they had heard. In the first listening, each dialogue was played without pauses, and in the second and the third listening, there was a pause between sentences to give the students time to write down the sentences.

As there was a chance that their listening comprehension was affected by the characteristics of the dialogue, another set of sound files was created with the same noise and speech rate conditions, but with different dialogues. For example, in textbook materials, material No. 4 was recorded with background noise and fast speech rate for the first experiment, but for the second experiment, material No.1 was recorded using the same conditions. After two weeks, the participants listened to the second version of the dialogues taking the same procedure as in the first experiment.

Scoring and Data Analyses

All the dictation sheets were collected and scored using Oller's (1979) methods of marking dictation. Oller suggests that spelling errors should not be considered incorrect because spelling is not the focus of the skills to be measured in most of the dictation activity. The percentage of the words for which the participants got the correct answer was calculated. As they took the dictation test twice, their scores in the first tests and those in the second tests were added, and the mean score, which was considered to be their final score for each sound condition, was produced.

Based on the scores of the dictation tests, two analytical procedures were taken. First, to examine the effects of the material type, the noise, and the speech rate on learners' listening comprehension abilities, A 2 (Material: Teaching, Film) × 2 (Noise: Silent, Noise) × 2 (Speech Rate: Fast, Slow) three-way analysis of variance (ANOVA) was conducted on the scores of the dictation test. Second, a multiple regression analysis was applied to analyze the factors that affect learners' listening comprehension the most. In conducting the multiple regression analysis, the scores of the listening proficiency test were chosen as dependent variables.

Regarding the questionnaire, the number of students who chose an item was counted for each question item. Then, the percentage of the students who chose the item, as well as the mean for each item, was calculated.

Results and Discussion

Listening Proficiency Test

The full score of the listening proficiency test was 22, the mean was 13.50, and the standard deviation was 3.39. The internal consistency of the test was α = .681, which is considered to be good reliability. The data was considered to be normally distributed.

Dictation Tests

Table 3 and Figure 2 show the results of the dictation test scores. As Figure 2 clearly shows, the mean dictation scores of the film materials were lower than those of the textbook material in all conditions. Moreover, in both materials, the mean score of Noise and Fast condition was the lowest among the eight conditions.

TABLE 3
Dictation Test Scores of Teaching and Film Materials

	Silent				Noise			
	Slow		Fast		Slow		Fast	
Material	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Teaching	64.91	22.90	59.61	20.78	60.63	20.03	50.79	25.53
Film	45.27	21.71	46.37	18.23	49.05	18.53	34.74	17.34

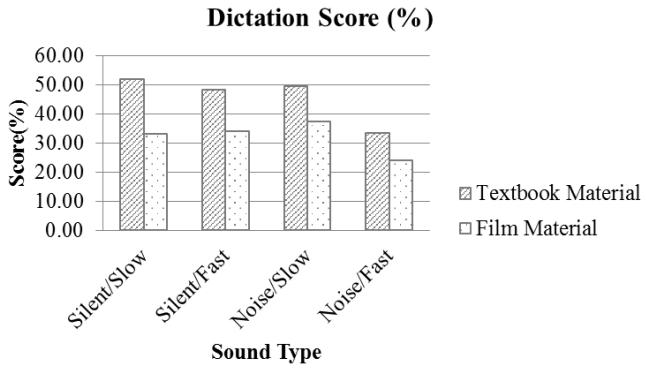

Figure 2. Results of the eight dictation test scores.

A three-way ANOVA was conducted on the scores of the dictation test. As Table 4 shows, the main effects of Material, $F(1, 89) = 325.365$, $p < .001$, $\eta_p^2 = .785$, Noise, $F(1, 89) = 57.125$, $p < .001$, $\eta_p^2 = .391$, and Speech Rate, $F(1, 89) = 168.733$, $p < .001$, $\eta_p^2 = .655$ were significant. This shows that all of the three factors had effects on the students' listening comprehension.

The results also showed a significant two-way interaction between Material and Noise, $F(1, 89) = 5.320$, $p < .05$, $\eta_p^2 = .056$, and Noise and Speech Rate, $F(1, 89) = 65.164$, $p < .001$, $\eta_p^2 = .423$. However, the interaction between Material and Speech Rate was not significant, $F(1, 89) = .689$, $p = .409$, $\eta_p^2 = .008$, indicating that their listening scores were lower in the Fast condition than the Slow condition for both material types. The three-way interaction of Material × Noise× Speech Rate was significant, $F(1, 89) = 19.344$, $p < .001$, $\eta_p^2 = .179$.

As the interaction was significant, a post-hoc comparison was conducted. The results of the simple interaction effect showed that the interaction between Material and Noise within the Slow Speech Rate was significant, $F(1, 89) = 25.099$, $p < .001$, $\eta_p^2 = .220$. Material and Speech Rate within Silent condition, $F(1, 89) = 17.982$, $p < .001$, $\eta_p^2 = .168$, and Noise and Speech Rate within Film Material, $F(1, 89) = 79.$

906, $p < .001$, $\eta_p^2 = .473$ were also significant.

Then, the simple-simple main effect was examined for each factor. The simple-simple main effect of all the factors was significant except the effect of Speech Rate for Film Material and Silent condition, $F(1, 89) = 1.367$, $p = .245$, $\eta_p^2 = .015$.

The simple-simple main effect of Material was significant in all conditions at Noise and Speech Rate ($p < .001$). The test scores of the textbook materials were higher than that of the film materials in all conditions. Therefore, it indicates that the students' listening comprehensibility of the textbook materials was significantly higher than that of the film materials.

The simple-simple main effect of Noise was also examined. The results of the analysis showed that in all the conditions there was a significant effect of Noise when combined with Material and Speech Rate. However, in looking at the mean scores of each condition, it was revealed that in Slow and Film, the test score increased from the Silent condition to the Noise condition. This indicates that in listening to Film Material at Slow Speech Rate, the students were not negatively affected by the presence of the background noise. In all the other conditions, Textbook material in both speech rates and Film Material with Fast Speech Rate, the students' listening comprehension was lower in the Noise condition than that in the Silent condition.

Regarding the simple-simple main effect of Speech Rate, in all the conditions except the simple-simple main effect of Speech Rate in Film and Silent conditions, the simple-simple main effects of Noise combined with Material and Speech Rate were significant ($p < .001$). This shows that in Textbook material, the students' listening comprehensibility was negatively affected by the fast speech rate, whether the noise was added or not. In the Film plus Noise condition, the students' listening comprehension scores decreased from the Slow Speech Rate to Fast Speech Rate. However, in the Silent condition, Fast Speech Rate did not affect the students' comprehension of Film Material.

TABLE 4
Effects of Material Type, Noise, and Speech Rate on Listening Comprehension

Variables	*SS*	*df*	*MS*	*F*	*p*	η_p^2
	Within Subjects					
Material	41182.573	1.000	41182.573	325.365	.000	.785
Error	11265.027	89.000	126.573			
Noise	4931.862	1.000	4931.862	57.125	.000	.391
Error	7683.822	89.000	86.335			
Speech Rate	9035.114	1.000	9035.114	168.733	.000	.655
Error	4765.662	89.000	53.547			
Material × Noise	309.987	1.000	309.987	5.320	.023	.056
Error	5185.455	89.000	58.264			
Material × Speech Rate	41.830	1.000	41.830	.689	.409	.008
Error	5401.876	89.000	60.695			
Noise × Speech Rate	4474.612	1.000	4474.612	65.164	.000	.423
Error	6111.390	89.000	68.667			
Material ×Noise× Speech Rate	1330.066	1.000	1330.066	19.344	.000	.179
Error (Material ×Noise× Speech Rate)	6119.579	89.000	68.759			
Total	107838.854	630.000				

The results of the three-way ANOVA showed that the three factors, that is, speech rate, background noise, and material types affect the learners' listening comprehension. However, it was not identified which factor affected the listening comprehension the most. Therefore, in order to determine which factor has the most significant influence on listening comprehension, multiple regression analyses were employed. The dependent variable was set to be the score of the listening proficiency test, and the independent variables were the scores of the eight dictation tests.

The forced-entry regression analysis was conducted to identify the factor that most affects the listening

comprehension of the students. The results of the forced-entry analysis indicate the first step model should be applied (Table 5).

The result showed that the test of Film, Noise, and Fast significantly predicts students' listening comprehension questions ($p < .01$). With Film, Noise and Fast first entered into the equation, an R^2 of .364 was produced, which indicates that this independent variable alone accounted for 36.4% of the listening comprehension test variance.

TABLE 5
The Results of the Forced-entry Regression Analysis

	B	*SEB*	*β*	*t*	*p*	R^2*(Adjusted* R^2*)*
Film_Noise_Fast	.100	.036	.510	2.736	.008	.364 (.301)

Note. $N = 90$.

The forced-entry regression analysis showed no models other than Model 1, which was the Noise and Fast condition using Film Material. The coefficients indicate that other models do not significantly predict the students' listening comprehension abilities. Therefore, it indicated that the Noise and Fast condition with Film Material was the most difficult for the students. Those who scored high in the listening proficiency test did well in the Film, Noise, and Fast condition, while those who did not do well in the proficiency test had low scores in that condition as well. As no other models were produced by the regression analysis, it was not possible to determine which of the factors, background noise or speech rate, has the most effect on listening comprehension.

Questionnaire

After finishing the dictation test, the students answered the questionnaire. Table 6 shows the results of the questionnaire. Regarding the difficulty level of the dialogues, the results of the students' perception of difficulty match the factors that affected the difficulty levels of the dialogues. In Q1 and Q3, where the easiest dialogue in each part was asked, the percentage decreases from Slow and Silent to Fast and Noise using both materials. It is obvious that the students felt the Slow and Silent condition the easiest.

Q2 and Q4 asked about the dialogue that the students felt was the most difficult to comprehend. In both materials, the students felt that the Fast and Noise condition was the most difficult, 78.41% in film material, and 46.59 % in textbook material.

Some of the students commented on their perception about difficulty levels. In analysis on comments, their comments were categorized into two types. The most comments were about the speech rate. Most of the students commented that in the Fast and Noise condition, they felt the fast speech rate was the source of difficulty. The other factor was about the word level of the passage. Some comments showed that they chose the easiest or the most difficult item based on the word level of the text. This is probably because the students were asked to take dictation, and much of their attention was paid to the word levels of the sentences.

TABLE 6
The Results of the Questionnaire About Difficulty Levels of the Dictation Test

Material Type	Film Material (Part A)				Textbook material (Part B)			
	Q1. easiest		Q2. most difficult		Q3. easiest		Q4. most difficult	
Speech Rate and Noise condition	*n*	%	*n*	%	*n*	%	*n*	%
Slow/ Silent	39	44.32%	3	3.41%	70	76.92%	6	6.82%
Fast/ Silent	27	30.68%	5	5.68%	12	13.19%	11	12.50%
Slow/ Noise	21	23.86%	11	12.50%	7	7.69%	30	34.09%
Fast/ Noise	1	1.14%	69	78.41%	2	2.20%	41	46.59%

In Q5, which compared the difficulty levels of Film and Textbook materials, 92.75 % of the students answered that they felt Film materials more difficult than Textbook materials. Their comments indicate that they felt Film materials harder to comprehend mainly because the word level was more difficult, or they felt each sentence to be longer in Film materials. Their comments are intriguing, as the word levels and the readability were set to be at the same levels in both material types. There were other students who commented that they felt the speech rate of Film materials faster than Textbook materials. Again, like the word level, the speech rate of Film and Textbook materials were set to be the same, so they just felt the speech rate faster in Film materials even though they were actually at the same level.

One student commented, "I was not familiar with the topic of the dialogues in Part A (Film material)." Another student commented, "(In Film material,) it was difficult to grasp the main theme of each dialogue." It can be said that these comments insightfully analyzed the reasons why they felt the Film materials more difficult. One possible explanation is related to topic familiarity of each dialogue, i.e., whether it was easy for the students to grasp the topic of the dialogue or not.

In Textbook materials, the script of the dialogue was developed to assess listeners' comprehensibility, and it gave some obvious hints about what the conversation was about in a short dialogue. For example, one of the Textbook materials started with the sentence "My computer is too slow", with a response of "How old is it?" In listening to the first utterances, it is obvious to the listeners that the dialogue is about a problem with a computer. Thus, the listeners can imagine that the speakers would talk about things related to the computer. In Film materials, on the other hand, most of the dialogues do not have a clear topic, hence, it was difficult to understand what they were talking about. For example, in one dialogue, the conversation starts with "I think something bad happened." and "What are you talking about?" In the original film, which was an action film, the main character, who suffered from amnesia, was chased by someone. It might have helped the students to have such background knowledge about who the speakers were. However, it was decided not to give some background knowledge about the speakers because it was feared that giving such background knowledge before the dictation might have some effect on their listening comprehension, and it might not be possible to assess the effects of the three factors, speech rate, the noise, and the material type, accurately.

The results of the questionnaire matched the dictation scores. Therefore, it can be said that the students' listening comprehensibility measured by the dictation test was the same as the students' perceived difficulty levels of the materials measured by the questionnaire.

Though the results of the questionnaire suggest that noise had more effect on their listening comprehensibility than the fast speech rate, their comments suggest that their listening comprehension was affected more by the speech rate. Not many comments were observed regarding noise as the factor that disturbed their listening comprehension. Therefore, the results of the questionnaire did not clearly show which factor affects the perceived difficulty more, noise or speech rate. It can be said that the students felt that the speech rate of the Slow and Noise condition was fast because of the noise. However, they did not notice the cause of the difficulty as the noise, and instead, they thought their comprehensibility decreased because the speech rate was fast.

Conclusion and Implications for Teaching

The present study examined the effects of speech rate and background noise on learners' listening comprehensibility. Each condition (noise and speech rate) was examined with two kinds of materials, textbook material, and film material. For the noise condition, some background noise was added to the sound file, and for the silent condition, no background noise was added. Regarding the speech rate, the dialogue was recorded with either the fast or the slow speech rate. Therefore, the learners' listening comprehensibility of eight sound files with different conditions of speech rate, noise, and material type was analyzed in this study.

Regarding the effects of background noise and speech rate on learners' listening comprehensibility

(RQ1), it was found that the learners' listening comprehension was affected by both factors. Their listening comprehension was negatively affected the most when both factors were present, i.e., the Fast and Noise condition. The results of the dictation test showed that their dictation score was the lowest in the Fast and Noise condition using either material. Their perceived difficulty, which was measured by the questionnaire, also showed that they felt that the Fast and Noise condition the most difficult.

Regarding the effects of noise, the learners' listening comprehensibility was negatively affected by the presence of noise in all conditions except for the Slow Film condition. In the Slow Film condition, the dictation score slightly increased when the noise was added. This can be explained as indicated by the comments from the questionnaire; the Film material was challenging for the participants even in the Slow and Silent condition. Therefore, their listening comprehension of Film material was not much affected by the noise.

As far as speech rate is concerned, the result was similar to that of noise. In all conditions except for the Film and Silent condition, listening comprehension significantly decreased in the fast speech conditions of both materials. This indicates that it was difficult for the students to comprehend the script spoken at the fast speech rate. Only in the Film and Silent condition was no difference observed in comprehension between the fast and the slow speech rates. Similar to the effect of noise, listening comprehension of the film material was difficult even in the Slow and Silent condition.

In the current study, the effect of material type was also taken into consideration. It was examined whether the effects of background noise and speech rate on learners' listening comprehensibility were different depending on the material type or not (RQ2). The results of the dictation test showed that the scores in the film materials exercise were significantly lower than those in the textbook materials exercise. The results of the questionnaire also showed that the students felt that the film materials were more difficult to comprehend than the textbook materials.

Even though the readability and the word levels used in the dialogues were set to be at the same levels across the two material types, it should be mentioned that there were some factors other than the readability and the word levels that made the film materials more difficult than the textbook materials. As some of the students mentioned in their comments, the topic dealt with in each dialogue was different. In textbook materials, the topic of the dialogues was easy for test takers to understand probably because the test developers intended the dialogue to be a topic familiar to most test takers. In film materials, on the other hand, each dialogue was extracted from one scene of a film. Therefore, the topic of each dialogue was not clear to the listeners and the lack of topic information made listening comprehension of film materials difficult. Informal ways of speaking or incomplete sentences also made film materials difficult to comprehend.

As stated above, the current study showed that fast speech rate and background noise negatively affect learners' listening comprehension. However, when using film materials, the slow speech was not negatively affected by the background noise. Also, in the silent condition, the speech rate did not affect listening comprehension. The use of textbook materials clearly showed that listening comprehension was negatively affected by a fast speech rate and the presence of noise. When both fast speech rate and noise were combined, listening comprehension level was the worst.

This study clearly indicated that the learners' listening comprehension was affected by the speech rate, the noise, and the material type. However, some limitations can be found regarding the current study. First, to examine the effect of each factor, only two kinds of each factor were used in the experiment. In case of speech rate, the dialogue spoken at the rate of 140 wpm was considered to be the slow speech rate, and that of 190 wpm was regarded as the fast speech rate. In the current study, the effect of speech rate was observed, but the effect is limited to the comparison between two speech rates. Likewise, in the factor of noise, the effect of noise was examined either by the presence or absence of background noise. Therefore, it should be pointed out that the effects of speech rate and background noise determined in the current study were examined in a limited extent. The material type was also limited to the film or the textbook materials used in the experiment. It has to be said that the results of the current study were limited to the conditions set in the current study.

Second, the results of the present study did not thoroughly clarify the differences between the textbook materials and the film materials. In order to make the effects of noise and speech rate the minimal pairs in the current study, the scripts of both materials were converted into synthetic speech. However, as synthetic speech was used, the distinction between the textbook materials and the film materials became less clear. The scripts of film materials contained some distinctive features of film materials, such as incomplete sentences, less information about the topic, or phonological changes. Such features made the film materials more difficult to comprehend than textbook materials. The distinction between the film materials and the textbook materials used in the current study could be considered to be due to the difficulty level of the scripts. Though the readability and the word levels of the textbook materials and the film materials were at the same level, the results of the dictation test and the questionnaire suggest the possibility that the differences between the two material types were other than just the readability and the word level.

Although the current experiment had some limitations, it showed some important pedagogical implications about listening instruction. First, it was suggested that learners needed to acquire listening skills to comprehend input with some background noise. It is often said that language learners are not good at listening to fast speech rate, but their inability to comprehend the speech with some background noise is often underestimated. In textbook materials that learners are familiar with, the speech is usually developed for the purpose of language learning. Thus, at most times, textbook materials for listening practice are not associated with some background noise. The current study showed that learners' listening comprehension is affected by a fast speech rate as well as background noise. Therefore, it is necessary for learners to get used to listening to fast paced speech or sound with background noise.

Second, it indicated that some support, such as information about the context or explanation about the topic, might help learners in listening to film input. In the current study, even though the readability and the word levels of the textbook materials and the film materials were set to be at the same level, the learners' comprehension differed between these two materials. It was analyzed that they could not comprehend the film material well because it was difficult for them to comprehend the topic of the film materials. In using film materials for listening practice, instructors should examine whether the materials have enough contextual information about the topic. If the listening materials do not have enough contextual information to support the learners' listening comprehension, some information related to the references to the objects in the materials would assist learners in better listening comprehension.

This study had some implications on the effects of speech rate and background noise on learners' listening comprehension of film and textbook materials. In the study of listening, especially the effects of background noise, hitherto have not been studied in the field of language learning and teaching. Further study is needed to examine the effects of such factors with different degrees and kinds of speech rate, background noise, and material types.

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Appendix A

Examples of the Listening Test

Film Material (Roman Holiday)
W: I ran away last night, from school.
M: Oh, what was the matter? Trouble with the teacher?
W: No, nothing like that.
M: Well, you don't just run away from school for nothing.

Textbook material (Third Grade STEP Test)
M: My computer is too slow.
W: How old is it?
M: I got it five years ago. I'm thinking about buying a new one next month.
W: Good idea.

Appendix B

Questionnaire Items on Listening Test

Questionnaire about the dictation test

A. About Part A

1. Which dialogue was the easiest to comprehend? (Circle one answer)

No.1 No.2 No.3 No.4

Why?_____

2. Which dialogue was the most difficult to comprehend? (Circle one answer)

No.1 No.2 No.3 No.4

Why?_____

B. About Part B

Which dialogue was the easiest to comprehend? (Circle one answer)

No.1 No.2 No.3 No.4

Why?_____

4. Which dialogue was the most difficult to comprehend? (Circle one answer)

No.1 No.2 No.3 No.4

Why?_____

5. Which part was more difficult, Part A or Part B? (Circle one answer)

Part A · Part B

Why? _____